

January 1938

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LYALLPUR, JANUARY 1938.

Vol. 2

OURSELVES

Breathes there a mother who does not feel enraptured at beholding her child take a dubious step or two for the first time? We are today aware of an almost similar ecstasy. This child of Indian horticulture society has just completed the first year of its existence, and we are glad to think that it shows every sign of overcoming the first uncertainties of life.

In commemoration of our first anniversary we feel gratified at being able to present in the form of this special number an attractive souvenir. We trust that it would generally be realised that one year is too short a period for a quarterly like the Fruit Journal to achieve any considerable accomplishment in the domain of journalism, but even during this short time at our disposal and despite endless limitations we have been able to make our mark so much so that we feel that possibilities of converting the journal into a monthly with weekly fruit price-bulletins is not too remote.

We have been singularly fortunate in the fact that the Press has been exceedingly hospitable to our venture. In fact we could legitimately congratulate ourselves at having been the recipient of great laurels in the form of glowing tributes deserved at the hands of such leading organs of public opinion as The Madras Mail, The Rangoon Times, The Commerce, The Illustrated Weekly, The Amrit Bazar Patrika, The Hindu, The Tribune, The C. & M. G. and The Eastern Times, besides many equally important vernacular journals. This has directly been responsible for a distinct advantage. The circle of admirers of The Fruit Journal is daily increasing, even beyond the four corners of our own province. Number of admirers of horticulture from Burma have desired to be placed on our subscription list, through V. P. P. but the new postal regulations prevent us to comply with their wishes.

With the ever increasing circle of our readers outside the Punjab, our responsibilities have also assumed a fresh role. We are being forced

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to become spokesmen of Indian horticulture. While we gladly venture to undertake in all humility this new responsibility, the development of the fruit industry of the Punjab on scientific, economic and progressive basis, will still always remain our prime concern.

We could, without any speculation say that the industry can confidently look ahead for better days during the new year. All indications are there to show that the Punjab Government will in all probability be, in a position definitely to earmark some subsidy for the beneficent programme of the Board. Our readers will be gratified to know that the Managing body of the Punjab Fruit Development Board has represented that the proposed Annual grant-in-aid should not be less than Rs. 5,000. It is the considered view of the Board that anything short of this amount would hardly meet the barest requirements. In this connection it is only pertinent to observe that in view of their newly introduced fruit marketing scheme, the annual subsidy of the U. P. Fruit Development Board has been increased to Rs. 6,010 from Rs. 4,000 which that Board had been enjoying since its inception. In a predominantly agricultural and what is more horticultural province like the Punjab, it should not be difficult to conceive that the Board will receive every possible encouragement and liberal subsidy from the Punjab Government.

It is, however, equally necessary that we must also tap some other source of permanent income besides Government aid if we are to give effect to our different beneficent activities, the most important of which are the establishment of a fruit market, the adoption of a bud selection programme for propagation of nursery plants, the publication of weekly bulletins, the co-operative purchase of our requirements and sale of our produce, etc. While we highly value the revenue we receive by way of annual subscription from members; it is obvious that the amount cannot cover the greater part of our activities. The problem deserves the sympathetic and earnest consideration of the Hon'ble Minister for Development who could give effect to the Board's demands placed before him by a Deputation which waited on him and the Hon'ble Premier and his cabinet at Simla last summer. The request to raise the Punjab Fruit Development Board into a Statutory body and provide funds for its various beneficent programmes by the imposition of a nominal cess on fruit acreage of the province, or by the alternative proposal of imposing additional Octroi Terminal Tax on fruits consumed in the Punjab, we feel, eminently reasonable as well as practicable. The best interest of the fruit industry could be served only by an immediate consider-

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ation of this highly important aspect of the problem. We hope that the "Fruit Group" in the Punjab Assembly will sufficiently interest itself to secure the materialisation of our hopes.

In wishing our readers a most prosperous and a happy New Year, we venture to express the hope that the new year will bring a new life and vigour in the Fruit Industry of the Province and secure the materialisation of our hopes.

A. WAHEED.

RENEWAL OF MEMBERSHIP

"Ordinary" and "Regular" members of the Punjab Provincial Co-operative Fruit Development Board are requested that as their term for membership for 1936-37 has expired they should remit their renewal fees by Money Order. "Regular" members are required to remit Rs. six each while "Ordinary" members an amount of Rs. three only.

"Life" members who have not completed the instalments of their life membership are also requested to do so now.

* * * * *

TO SUBSCRIBERS OF THE PUNJAB FRUIT JOURNAL

Most of the subscribers of the Punjab Fruit Journal started subscribing to the journal from the January 1937. With the supply of this issue their annual subscription expires.

They are requested to remit Rs. two by return to renew their subscriptions during this quarter, failing which the next issue of the journal will be sent per V.P.P.

* * * * *

THE NEXT ISSUE

The next issue of the journal will be a gist of all the experiments conducted by the Fruit Section of the Punjab Agricultural Department and as such will be a mine of useful information not obtainable elsewhere.

CHRONICLE OF THE FRUIT WORLD

1. Jietee Gardens Extension Programme:—Since retirement from judicial service S. S. Hukam Singh, has been taking active interest in the development of the Jietee Gardens in Chak No. 45 G.-B., District Lyallpur. The tremendous success of their Lyallpur District Garden has induced the Sardar Sahib to acquire a fairly large estate at Nawabshah, Sind, for establishing a first class 250 acres commercial garden. Sardar Jagjit Singh, son of S. S. Hukam Singh is personally looking after the new venture.

2. European Girl Zamindar:—Miss N. Rachel, daughter of Dr. Bernard Lowenthal, now in Lydda, Palestine, will be the first European girl Zamindar in India. She intends to establish a farm of her own at Mirpurkhas in Thar Parkar District after finishing a course of five years' training at the Lydda farm.

Miss Lowenthal, who is only 14 years of age has finished two years of her course. Her object is to start a vineyard and an orange grove of the famous Jaffa variety in Sind. We hear that she has already selected the land for her garden.

3. Senior Marketing Officer (Fruits) Tours:—Mr. H. C. Javaraya, Senior Marketing Officer (Fruit) of the Government of India paid a visit to Lyallpur and discussed with the Fruit Specialist, Punjab the various standards to be adopted for different fruit products which the latter had already proposed to the Government under the title of National Mark Scheme (Fruit products) to standardise the fruit products and develop the Industry on proper lines.

4. Russel and Wright Reports:—At the instance of H. E. the Viceroy, Sir John Russel and Dr. Wright visited India last winter to study the existing agricultural conditions and to recommend improvements. Sir John made a survey of all major schemes conducted by the Imperial Council of Agricultural Research, India and Dr. Wright confined himself to a study of the Dairy Industry only. Their reports have since been published and have aroused considerable interest.

5. Experimental Shipment of Navel Oranges to India:—Last Christmas Mr. S. Merrill Jr. Vice-Consul General, U. S. A., at Calcutta brought a private shipment of Washington Navel oranges to Calcutta—perhaps the first shipment of Navel oranges to India. They reached Calcutta in perfectly good condition after a long journey of six weeks.

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6. First Indian Woman to Supervise Citrus Station:—Miss R. Shah, M.Sc., (Michigan) who was for some time Assistant Botanist, Sabour Research Station (Bihar, India) has been appointed Horticulturist to C. P. Government. It is hoped that her valuable contributions to research on Citrus and other problems will prove of great utility.

7. Additional Grant-in-aid for the U. P. Fruit Development Board:

—The U. P. Fruit Development Board has been enjoying an annual subsidy of Rs. 4,000 since its inception. In view, however, of its newly introduced fruit marketing scheme the annual subsidy has been increased to Rs. 6,010 per annum. It is an example which we trust the Punjab Government will follow.

8. Emperor Jahangir and Fruit Growing:—The Great Mogul Emperor Jahangir to whose chaste artistic taste we owe the establishment of such beautiful gardens as the Shalimar Gardens of Kashmir and Lahore. Chronicles say of him, that he was keenly interested in the extensive development of fruit Gardening in the country. By the courtesy of K. B. Mian Afzal Hussain, we are able to quote an extract from the English translation of the *Tuzuk-i-Jahangiri*.

“.....God be praised that in this age-enduring state no tax has ever been levied on the fruit trees, and is not levied now. In the whole of the dominion not a ‘dam’ nor one grain (habba) on this account enters the public treasury, or is collected by the State. Moreover there is an order that whoever makes a garden on arable land, its produce is exempted. I trust that God (to Whom glory,) will always incline this suppliant what is good.”

9. Canning Plant in Bombay:—For canning of mangoes on a large scale a canning plant is being installed in a suburb of Bombay, and orders for 1,500,000 cans have been placed in England. Half a million tin containers have already arrived. The factory will be supervised by an Indian trained in U. S. A.

10. Canning of Oranges in Japan:—Canning of mandarines (Sang-tras) which was begun about three years ago in Japan, has reached considerable proportions. Exports in 1935 amounted to 233,052 cases (48 pounds each) of which 19,30,954 were exported to the United Kingdom, 21,457 to the United States, 5,645 to the Netherlands and 4,994 cases to Kwantung and Manchukuo. Still larger amounts were exported in 1936. Apparently the canning of mandarines at Shizaoka is carried on in conjunc-

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tion with tuna fish canning. The same equipment is used in canning both the products. When raw fish is out of season, oranges are canned, and in this way the canneries are able to run almost continuously.

11. **Export Subsidy for Egyptian Citrus Industry:**—With the assistance and under the supervision of Government, several co-operative packing societies, completely equipped with modern cleaning and sizing machinery have been started in Egypt. With a view to building the citrus export trade of the country the Egyptian Government is giving a subsidy at the rate of 150 millieme (1 mil=1 pice roughly) per box of oranges, and 75 millieme per half box of mandarines to all exporters who conform to the State laws of packing and grading. The export citrus trade of the country is steadily increasing as is indicated by the figures given below:—

Year	Export of citrus fruits in tons
1930	.. 20
1931	.. 56
1932	.. 190
1933	.. 830
1934	.. 2,867
1935	.. 5,183

(So far as the total area under fruit is concerned the Punjab is almost at par with Egypt and there are some geographical similarities too, but the Punjab has so far not exported even a ton of citrus).

12. **Palestine Citrus Fruit Exchange:**—The low prices which grapefruit fetched in foreign markets during 1936-37 have induced the Jewish shippers to reach an agreement for limiting the quantities of grapefruit to be shipped abroad during 1937-38—thus regulating the shipments of this fruit in order to improve market conditions and raise prices. This agreement was signed by members of the Jaffa Citrus Fruit Exchange, and authorizes the Exchange to arrange and supervise the carrying out of this agreement. The Jewish shippers belonging to the Jaffa Citrus Exchange control nearly 90% of the total consignments of grapefruit.

The agreement provides for the total quantity of grapefruit to be sent abroad. About 57% of this quantity will be shipped to Great Britain. A special supervisory committee with its seat in London will be appointed to supervise the carrying out of the agreement. Should this measure succeed, it will presumably give an impetus to the signing of a similar agreement regarding orange consignments.

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13. **Taxes on Citrus Lands Reduced in Palestine:**—Government has reduced the rural property tax on citrus lands from 825 mils to 500 mils per dunam ($\frac{1}{4}$ acre).

14. **Idaho State (U. S. A.) Fruit Advertising Campaign:**—Idaho State has started extensive advertising campaign to organise the sale of fruit and vegetable produce of the country. The money will be realised by levying a tax on growers of potatoes, apples, onions and prunes. The tax is anticipated to amount to one cent (roughly half an anna) per hundred-weight marketed. About a quarter of a million dollars, roughly over seven lacs of rupees, will be available for advertising in this way. By adopting similar methods the Punjab Government could also help in increasing the sale of Maltas.

15. **Florida Extends the Life of Citrus Commission:**—Continuance of the Florida Citrus Commission as a permanent body has been voted by both the Houses of Legislature of Florida. Measures provide for an assessment on citrus fruits for advertising purposes; strengthening maturity laws, and prohibiting the shipment of immature fruit.

16. **Citrus Fruit Advertising Ordinance in Palestine:**—This ordinance enacted in 1933 for advertising the Palestine Citrus fruits and the products made therefrom, provides for the imposition of a fee of $1\frac{1}{2}$ mils on every case or receptacle of citrus fruits exported.

17. **Washington State Advertising Campaign for Apples:**—During 1936-37 the Washington State Apple Advertising Commission was able to collect approximately \$170,000 (roughly five lacs of rupees) through the advertising cess. This enabled the advertising commission to conduct an extensive advertising campaign all over U. S. A.

18. **National Apple Group:**—To co-ordinate the promotion and advertising work of all the principal apple producing States of U. S. A. a national organisation to be called the 'National Apple Group' has been formed in U. S. A.

19. **Per Capita Consumption of Citrus in United Kingdom:**—The per Capita consumption of oranges in the United Kingdom is given by the Imperial Economic Committee as 23.8 lbs. for the year 1935, of lemons and limes 3.1 lbs. and for grapefruit 2.7 lbs. The U.S.A. consumption figures for that year are estimated at 26.95 lbs. for oranges, 3.97 for lemons and 6.71 for grapefruit.

20. **Replacement of Plants that Fail to Grow:**—The members of the Virginia (U. S. A.) Nurserymen's Association have agreed to replace, free of charge, all plants which die without any known cause of neglect within thirty days of purchase and delivery. They have also agreed to replace, at half price, all plants that die after thirty days, provided that there has been no neglect in their looking after.

In California too a new Nursery Stock Law has been enacted. It provides that all plants sold in California should be labelled according to certain prescribed standards, and that each plant or lot of nursery stock shall be as good as the label provides.

21. **Ban on Fruit Colouring Postponed:**—The date for the proposed ban on the use of a coal-tar dye process of artificially colouring Florida oranges, set for September 1, 1936, and extended for one year, has now been indefinitely postponed by the Federal Department of Agriculture. The above has been agreed upon on the distinct assurance from the State of Florida to continue to have close vigilance in setting up a standard as to the character of fruit which may be submerged for colour. About two-thirds of the commercial orange shipments from Florida in 1936-37 are said to have been colour-added.

22. **Australia Using New Storage Process:**—The Lockyer storage promises to revolutionize the commercial storage of perishable fruit. The process consists in retarding the breathing rate of the fruit by controlling the oxygen and carbon dioxide supply. Refrigeration is unnecessary, and the cost of installing and operating the plant required is substantially reduced in consequence.

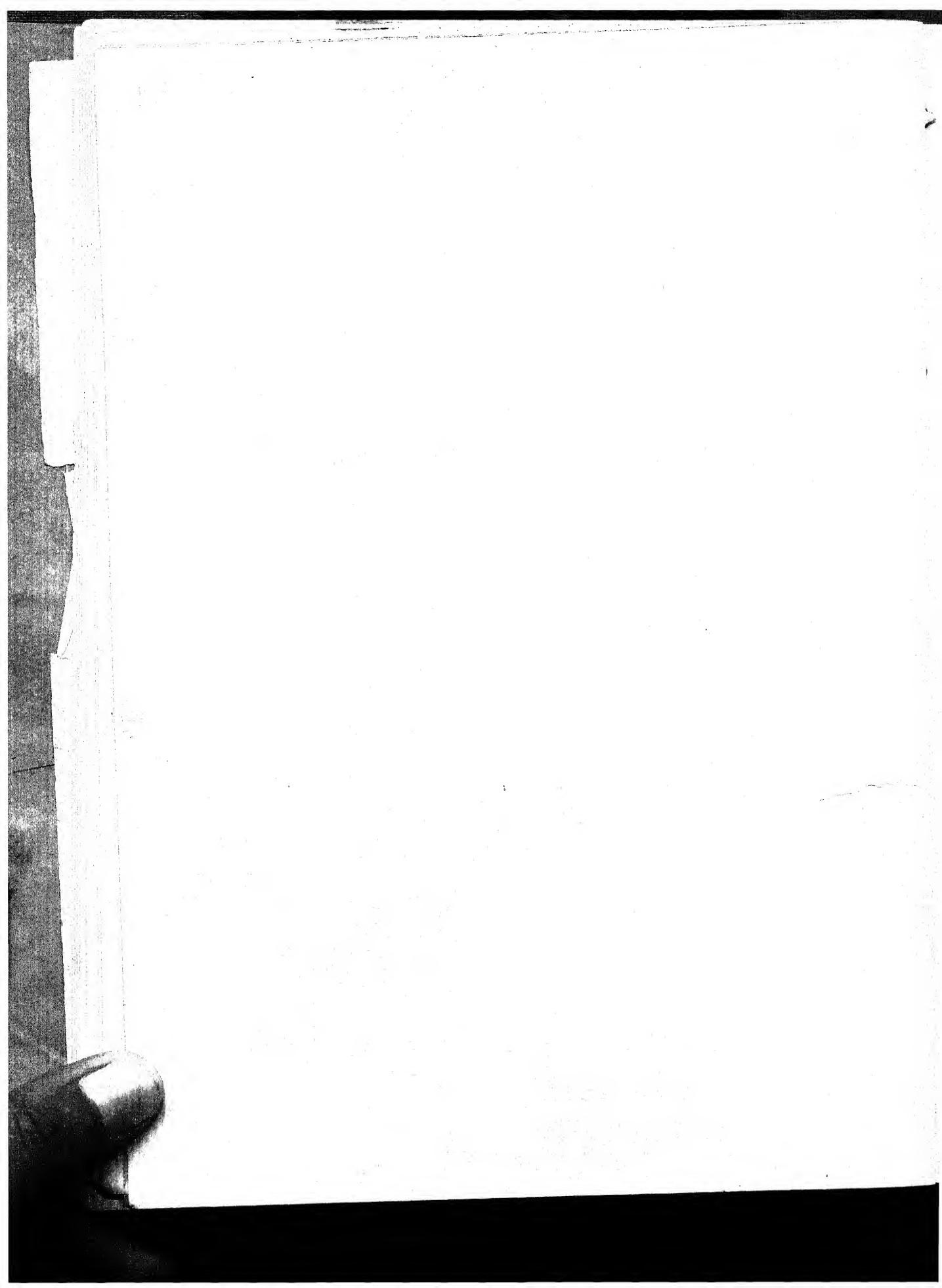
23. **Quick Fruit Ripening Method:**—Fruit can now be artificially ripened in half the usual time. The new method is to put back into the fruit the gas that is given off in natural ripening. Experiments proving the value of the gas process have been conducted under the direction of Dr. R. B. Harvey, Plant Physiologist at the University of Minnesota experimental farm. Ethylene gas was used and it is believed that even this time may be further reduced.

Apples, pears and other fruits sealed in an ethylene filled room ripen in half the time of those on trees, and have a sweeter flavour. Bananas turn an even golden brown and weigh more, while tomatoes become uniformly red in six days rather than in fourteen days required by nature. Ethylene is given off in small quantities by the fruit as it ripens under normal conditions. It is non-poisonous and leaves no noticeable odour or taste.

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THE HON'BLE CHAUDHRI SIR SHAHAB-UD-DIN, KT.,
SPEAKER, PUNJAB ASSEMBLY AND PRESIDENT OF THE
PUNJAB FRUIT DEVELOPMENT BOARD, WHO WILL INAUGURATE
THE THIRD GENERAL ANNUAL MEETING OF THE BOARD
ON JANUARY 12, 1938.



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24. \$5,000 Awarded for Improved Frost Protection Devices:—

To secure definite improvement in frost protection of citrus orchards, President C. C. Teague of California has offered an award of \$5,000. The closing date was 15th December 1937.

25. Red-Scale and Yellow-Scale:—Mr. L. Mekenzie, laboratory assistant in Entomology at the Citrus Experiment Station, Riverside, California, has found a parasite that preys upon and controls the yellow-scale but not the red-scale. It has now been confirmed that the yellow-scale is entirely a new species.

26. Segregation Machinery:—Exceptionally heavy frost in January 1937 in California has hastened the perfection and putting into commercial use of machinery for separating the frost damaged fruits from the healthy ones. One such machine called the 'Citrus Fruit X-Ray Analyzer Machine' has been introduced in the market by the Citrus Machinery Co. of Riverside California.

27. Golden Gate International Exposition:—With about two crore of visitors from all parts of the world expected at the 1939 Golden Gate International Exposition of San Francisco, preparations have been in progress for it over a year now. An artificial island site of about four hundred acres has been especially created. No fewer than four thousand trees, seventy thousand shrubs, two hundred thousand perennials, and two hundred thousand bulbs have been assembled at Balboa Park for transplantation in the coming season. California Citrus Exchange and other fruit organisations of various countries are also making special efforts to display their fruits at the Exposition.

28. Popular Horticultural Literature:—(1) Bulletins dealing with the fruit industries of (a) Egypt, (b) Palestine, (c) Italy and Sicily, (d) France and Switzerland have just been published. Each bulletin is priced at annas eight and is available from the Honorary Secretary, Punjab Fruit Development Board, Lyallpur. A set consisting of four bulletins will, however, cost Rs. 1-12-0 only.

(2) Domestic Preservation of Fruit and Vegetables: The Ministry of Agriculture United Kingdom's Bulletin No. 21, is available from His Majesty's Stationery Office Adastral, Kingsway, London. It is priced at one shilling net.

(3) "The Fruit Annual:" This new book of the world's Fruit trade is published by the British-Continental Press Ltd., 80, Fleet Street, London; and is priced at 10 shillings, post free.

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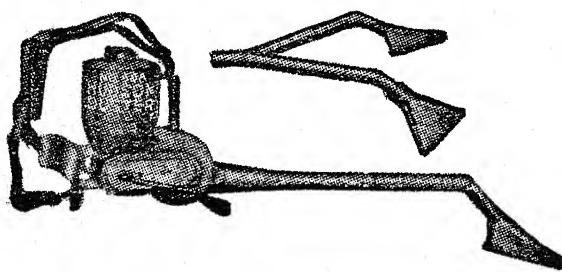
29. **Fruit Products Industry:**—It takes a long time to start new industries. Numerous difficulties in the initial stages have got to be overcome. This is possible only through liberal State Patronage in the form of subsidies, loans, state protection, etc., which unfortunately have been so far denied to this new industry. In spite of this we are gratified to note that this industry is making steady headway.

Messrs. Rahman and Sons, manufacturers of Jams and Jellies have built a big factory on the Grand Trunk Road, near the Shalimar Gardens, Lahore. Indian Mildura Fruit Farm, whose KISSAN brand squashes have already established a reputation throughout India are also increasing their output. Messrs. Gobind Ram Kahn Chand who manufacture various fruit products like Jam, crystallized fruits, Juices, etc., Punjab Pure Fruit Products Ltd., are specialising in squashes, tomato juice and Messrs. Gardeners India Juices, Lyallpur, are all making satisfactory progress. The Glacier Fruit Products Company, Pathankot, controlled and financed by L. Mehar Chand Mahajan, Advocate, Lahore, have also installed an up-to-date Fruit Juice Plant and their initial output of juices is already impressive. The Grape juice Cordial, prepared by the Punjab Fruit Industries, Renala Khurd, started by S. Ram Singh Sarkaria, lately Government Bacteriologist, has also been well commended.

Reports have also been received that besides the New Era Industries Ltd., Lahore (which has been already referred to in our last issue) various other important people like L. Siri Ram of Delhi Cloth Mill fame, Syed Amjad Ali, M. L. A., the Parliamentary Secretary and an energetic member of the "Fruit Group" in the Assembly, are expected to start the work in the near future. Trained men are required to look after these undertakings. And in this connection the services of half a dozen Graduates who have just completed their Post-Graduates training in Advanced Fruit Preservation under the Fruit Specialist, Punjab, are sure to prove of considerable service.

30. **Our Editor Elevated:**—We are glad to announce the appointment, as Member of the Political Section of the League of Nations at Geneva, of Dr. A. Waheed, our Honorary Joint Secretary and Honorary Editor of the Punjab Fruit Journal. His departure for Europe early in the New Year will deny the Punjab Fruit Development Board of the honorary and willing services of an experienced and talented journalist and an energetic advocate of the fruit industry.

K. L. Kohli, M.A., L.S.G.D.



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LOCAL AND PROVINCIAL

1. The Provincial Fruit Show at Lahore

As usual the Provincial Fruit Show at Lahore will be held from 10th January to 13th January 1938 both days inclusive. The N. W. Ry. will grant concessions for the carriage of exhibits at quarter parcel rates. Exemption from terminal tax has also been obtained from the Lahore Municipal Administration. Prizes will also be awarded to best exhibits from the Districts in addition to best provincial exhibits. For particulars application should be made to the Director of Agriculture Punjab, Lahore or the Fruit Specialist, Punjab, Lyallpur.

2. Annual General Meeting of the Punjab Fruit Development Board

The Executive of the Punjab Fruit Development Board has decided to hold the next General Meeting of the Punjab Fruit Development Board during the Provincial Fruit Show at Lahore. Invitations for participation in the General Meeting to be held at 3 p.m. on January 12, 1938, at the Town Hall, Lahore will shortly be issued to members of the Provincial Board as well as to a number of prominent members of the District Fruit Growers Associations, Nurserymen, Commission Agents, Fruit Preservers and various District Officials etc. The Hon'ble Sir Shahab-ud-Din, President of the Board, has already approached the Hon'ble Premier Major Sirdar Sir Sikandar Hyat Khan to kindly address the meeting on this occasion. Last year the session was held at the Government House when H. E. the Governor was pleased to address the meeting. Complete information about the place of meeting, agenda etc. would be issued shortly.

3. Horticultural Section of the All-India Exhibition, Lahore

The Agri-Horticultural Section in the All-India Exhibition has proved to be a great rendezvous for all interested in agriculture and horticulture. The visitors are particularly attracted towards the miniature model garden and demonstrations of horticultural operations, which contain a number of interesting items like (a) examinations of Subsoil for gardens, (b) their layout, (c) selection of plants, (d) the propagation of nursery plants by cuttings, enarching, cleft grafting, (e) topworking of bers, etc., (f) whitewashing trees to protect them against sunburn, (g) method of pruning and training trees and vines, (h) control of insect pests and diseases, (i) display of horticultural implements, etc. The miniature garden shows how a model five acre garden should be laid out—

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DR. A. WAHEED, OUR HONORARY JOINT SECRETARY AND HONORARY EDITOR OF THE PUNJAB FRUIT JOURNAL WHO IS SHORTLY PROCEEDING TO GENEVA TO TAKE UP HIS APPOINTMENT AS MEMBER OF THE POLITICAL SECTION IN THE LEAGUE OF NATIONS.



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location of house, well, water channels, roads, foot-paths, sandils, kinds of trees to be planted, system of planting and layout, different systems of irrigation, kind of trees around garden to serve as windbreaks, etc., are all shown. A printed guide is given to the visitors which contains useful information about gardening. A part of the guide is reproduced elsewhere in the Urdu section for the benefit of our readers.

The Fruit Preservation Section has also a number of interesting items. This section is replete with exhibits of canned pears, fruit juices, squashes, Cordials, Tomato Ketchup, etc. Various pictorial placards relating to the fruit industry are also on display.

4. Punjab States Subjects and Membership of the Fruit Development Board

Hitherto membership of the Punjab Fruit Development Board was confined to the residents of the British Punjab only. As there was nothing to the contrary in the byelaws, the Managing Committee in its meeting of 30-10-1937 has made the position clear and has decided that residents of the Punjab States are also eligible, to become members of the Punjab Fruit Development Board. The way has thus been opened for the various Punjab States now to actively associate themselves in this useful Fruit Co-operative Movement.

5. Prizes for Contributors of the Punjab Fruit Journal

With a view to give impetus to present and prospective contributors of the Punjab Fruit Journal it has been decided to award prizes every year at the time of the annual Provincial Fruit Show at Lahore to a selected number of contributors to the Journal. For this purpose a special Sub-Committee of Judges has been appointed.

6. Lahore Fruit Market

At the instance of the Local Government the Director of Agriculture Punjab sometime ago invited proposals from the Honorary Secretary of the Board regarding (a) rent to be paid for the proposed fruit market site outside Shahalmi Gate, Lahore, (b) financing of the proposed market (c) design of the proposed market, its management, etc. Different aspects of the proposal were discussed at an emergent meeting of the Fruit Marketing Standing Committee and the unanimous decisions arrived at have been communicated to the Director of Agriculture. If the proposals are agreed upon, the construction work of the proposed fruit market should soon be taken up.

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7. Offers for Retailing of Fruits of Members of the Board

Along with the proposed wholesale fruit marketing scheme, the Board decided to try the experiment of direct retailing of fruits of members of the Board duly graded and packed through suitable agencies. Request for supply of a grading machine was made to the Agricultural Marketing Adviser to the Government of India. Offers of the Kashmir Fruit Mart Cawnpore and the Shivajee Fruit Mart Ltd., Lahore, were considered by the Managing Committee. But the schemes had to be postponed till the market site has been acquired by the Board.

8. Bud Selection Programme

The Board decided to get the important orchards of the Province visited by its Sub-Committee with a view to locate and mark out trees of outstanding merit so that nursery plants from such selected trees could be propagated for supply to its members. The whole scheme was worked out and forwarded to Government with the request that half of the cost of this scheme may be borne by Government while the other half will be borne by the Board. Much to the Board's regret the Punjab Government does not propose to take any separate action to provide funds for this beneficent scheme. On the contrary it expects the Board to meet the commitments of this useful programme out of the meagre grant expected after April 1938.

To hold in abeyance such a useful programme simply on account of lack of funds is hardly creditable either to the Government or the Punjab Fruit Growers. The Punjab Government would do well to reconsider their decision and provide funds for this much needed programme. Should the local Government fail to come to the rescue of the Fruit Growers in the matter, a small Bud Selection Society on Co-operative or Joint Stock basis should be organised under the auspices of the Board. This beneficent programme can be expected to pay its own way in a few years time.

9. Accounts of the Board

The annual audit of the Board was conducted by Raja Abdul Hamid, B.A., Inspector Co-operative Societies, Lyallpur.

10. Appointment of a Clerk for the Board

In view of the heavy routine work of the Board since the inception of the Fruit Journal, the Committee has sanctioned the appointment of a clerk for the Board.

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11. Opening the Hindustan-Tibet Road to Motor Traffic

The Secretary, Kotgarh Fruit Growers' Association, Simla Hills, has forwarded us a memorandum urging the opening of the Hindustan-Tibet Road to properly controlled motor transport of fruits and other hill products. A copy of the memorandum is being circulated by the Honorary Secretary of the Board to all members of the Punjab Assembly and appears elsewhere in this issue also. The question was discussed in the Managing Committee Meeting of the Board and was strongly supported.

12. Packing Wood for the Kulu Fruit Growers

It has been represented to the Board that it should move Government to ensure a liberal supply of forest timber wood for packing of fresh fruit.

Hitherto the forest authorities have been generous enough to meet the local requirements of packing wood from the adjoining forest areas, but it now appears that a departure from the traditional practice is being made, and fruit growers of the illaqa are being directed to purchase their requirements from distant depots.

Most of the Kulu fruit growers are right holders under forest settlement rules of the illaqa. They do not, however, propose to press for any special concession. They only wish to be supplied with their timber requirements from the forest trees adjoining their orchards. When foreign countries like Egypt, Australia, etc., are directly subsidising fruit export trade of their countries, and are establishing State Packing Houses, is it too much to expect that the Punjab Ministers of Development and Revenue should remove this petty grievance of the progressive fruit growers of the Kulu Valley, so that they may be able to successfully compete with imported fruits.

13. Murree Fruit Growers Association

Murree Hills Fruit Growers have rallied themselves under the banner of the Murree Hills Fruit Growers' Association and the Association concerned has applied for affiliation with the Provincial Fruit Development Board.

14. Donations from Local Bodies

The following local bodies have contributed the amounts noted against them as general donations towards the Punjab Fruit Development Board:—

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District Board, Lahore, Rs. 100, annually; Sialkot Municipality, Rs. 50; District Board, Montgomery, Rs. 250; District Board, Multan, Rs. 50; Amritsar Municipality, Rs. 50, annually; Municipal Committee, Mian Channu, Rs. 25; Municipal Committee, Khanewal, Rs. 25; District Board, Jhang, Rs. 20; Municipal Committee, Thanesar, District Karnal, Rs. 20; District Board, Ferozepore, Rs. 25, annually; Municipal Committee, Fazilka, Rs. 20; Town Committee, Kahrar Pakka, District Multan, Rs. 10; Town Committee, Gidarbaha, Rs. 10, District Board, Hoshiarpur, Rs. 40; Municipal Committee, Shujabad, Rs. 10; Town Committee, Guru Har Sahai, Rs. 15; Total Rs. 720.

The Board gratefully acknowledges these donations and expresses the hope that local bodies will continue to show increased patronage in future also. The Board needs a large sum of money to carry out its multifarious beneficent activities and we appeal to all local bodies to come forward with liberal donations.

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FRUIT GROWING IN INDIA

—Being—

The Speech delivered by Mr. N. C. MEHTA, I.C.S.,
Vice-Chairman, Imperial Council of Agricultural Research.

Mr. Mehta delivered a most impressive and thought provoking speech on the occasion of the first all-India meeting of the Horticultural Research workers held in September 1937, for the first time at Simla under the auspices of the Imperial Council of Agricultural Research. He remarked:

"It is curious that in a country such as India, where the bulk of the population is vegetarian, it should have taken so many years for the first Horticultural Research Workers' Conference to meet. This is probably an instance of the old adage that 'familiarity breeds contempt.'

"It is now well-known that the dietary of our people is woefully deficient, both from the point of view of quality and variety. The quantity of fruit and vegetables consumed in this country is totally inadequate, and this deficiency persists, despite the almost unlimited opportunities, for the profitable cultivation of both these products, both from the point of view of nutrition and money.

"In a country such as India, with its enormous range of climate and soils, where every kind of fruit can be produced, it is hardly creditable that we should be importing fruits from the United States of America, Australia, Japan and South Africa. This is not because the Indian fruit is in any way inferior, but because of inadequacy of organisation.

Wastefulness

"I may be permitted to give an instance of this kind of wastefulness. Custard apple of the finest quality grows wild in parts of Central India, such as Bhopal, and also in the State of Hyderabad, and the price it fetches is negligible. Yet this is a fruit which is greatly in demand and cannot be had in sufficient quantities in neighbouring areas, simply because the necessary organisation for storage, transport and marketing is lacking.

"The same is true of the numerous and delicious varieties of bananas which grow in such profusion on the Malabar Coast. The grapes of Quetta, peaches of Peshawar, oranges of Nagpur, pine-apple of Assam and mangoes of excellent quality from Madras, Bombay, the United Provinces and Bihar—all these fruits are plentiful in their proper seasons. But the seasons,

SOME OF THE OBSTACLES IN THE DEVELOPMENT OF FRUIT PRESERVATION INDUSTRY

Fruit preservation or fruit bye-products industry which was almost unknown a few years back in the Punjab is making a fairly rapid progress. As a result of the funds provided by the Imperial Council of Agricultural Research and Provincial Governments, a fair amount of research work is being carried out to standardise the methods of manufacture of various fruit products, and people are coming forward to take up this industry on a commercial scale. In the Punjab alone several firms have already taken up this work, and several more are contemplating to do so; and this industry if properly developed, is likely to attain great importance in the near future.

The greatest obstacle that has so far been experienced is in regard to the availability of containers both glass jars and tins at reasonable prices. It has been estimated that in the case of many products the cost of containers alone comes to about one half of the total cost of production, and even then the containers are not satisfactory. Formerly ready made cans used to be imported from England and America but because of their bulk the cost on account of freight used to be rather excessive. Now the cans are imported in flattened form, but even then they are fairly expensive. Apart from this, machinery worth about Rs. 1,500 is needed to reform and flange these cans. The cost of flattened cans of A-2 size comes to about Rs. 100 per 1,000 which is rather excessive. Similarly in the case of glass containers either second hand bottles are used which is after all not a very desirable arrangement, or bottles have to be imported from outside at a fairly high cost. Unless some satisfactory arrangement is made for the supply of containers at reasonable prices, the fruit preservation industry is bound to suffer from this desideratum.

The Government should come forward to help this industry in one of the following ways:—

- (a) The Government should either purchase a tin making plant, run it or lease it on easy terms so that the cans may be supplied at a reasonable cost to the manufacturers of fruit products; (b) either give financial help to the manufacturers of tins or guarantee the purchase of a minimum number of cans which may be supplied to the public at a reasonable price; (c) Similarly in the case of glass containers the Government should subsi-

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dize the glass manufacturers to produce the desired kind of glass containers and purchase the same from the manufacturers for supply to the fruit preservers at a reasonable price. It may be mentioned that this subsidy will be needed only in the initial stages of the industry. After some time when the number of glass or tin containers, required for the industry, becomes fairly large the manufacturers would find it profitable to produce these without further subsidy; (d) If the proposals referred to above regarding the supply of tins and glass jars be not feasible for one reason or another, the least that Government should do is to exempt these containers from import duty and arrange for their carriage from the port to the interior at a nominal cost.

Another way in which the Government can help this industry is to exempt from excise duty the sugar that is used in the manufacture of fruit products. This can be easily arranged, i.e., a fruit preserver at the end of the season can claim a rebate of excise duty on the total amount of sugar used in his factory. In fact one important manufacturer of fruit squashes in the Punjab has already made strong representation that either fruit products and squashes imported from outside should be subjected to greater import duty than at present or the sugar used in its manufacture here should be exempted from excise duty. The ground of his representation is that in fruit squashes, sugar is the main item of expenditure and import duty on raw sugar or excise duty on country made sugar is more than import duty on the manufactured fruit products like squashes.

If assistance is rendered in the two ways mentioned above, i.e., supply of containers at reasonable price, and exempting from excise duty the sugar used in the fruit products factory, this industry which is still in its infancy is bound to get a good impetus and Government should not hesitate to render this assistance in its early stages.

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SOME OBSERVATIONS ON THE MARKETING OF FRUITS
IN THE PUNJAB

—By—

S. PRITAM SINGH, M.Sc.,
Assistant Marketing Officer, (Fruits),
Punjab, Lahore.

It is perhaps not too much to say that the responsibility of the fruit growers at present ends with the production of the fruit, almost no part being played by them in the further distribution of the produce. The common practice with the growers as known to many, is to sell the fruits on the trees to pre-harvest contractors for one year or more. One year system is more common, but instances exist, where contracts have been made for as long as six years. The contractors, therefore, are responsible for picking, packing, and marketing the fruits and usually do it in the manner suited to them. The very method of sale adopted by our growers presents a sharp contrast with that followed in horticulturally advanced countries like U. S. A. and South Africa. In these countries the growers, apart from looking to the production side, take full interest in the marketing of their fruit and represent themselves directly or indirectly in the trade until the fruit reaches the retailers. Consequently they are fully conversant with the whole of the marketing machinery as well as with public demand and taste. The mere presence of their interest in the trade gives them an opportunity to control the trade as a whole and to make distribution more orderly to suit the demand of a particular market. This is all achieved through collective efforts, as individual efforts have consistently proved costly and futile.

The main advantage in the system of sale adopted by our growers is that the marketing risk is shifted to a second party and also the over head expenses to be incurred in the way of watching the fruits, etc., are saved. Where gardening is taken only as a side line, the other agricultural operations which demand attention simultaneously become an additional cause for adopting the current system of sale. Another reason put forward by some enterprising growers is the unfairness of fruit commission agents in the market, with which few care to cope. The ignorance of the growers in regard to marketing technique and their lack of information regarding the market also stand in their way for direct marketing.

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It is quite true that the marketing risk is shifted to a second party, but the latter also does not enter into business without anticipating gain. Some growers admit that the contractors make considerable profits, though not in all seasons. On the other hand some growers complain of remissions having to be made to the contractors in bad seasons. The remission may be as high as 20 to 25 per cent of the price originally settled. Contractors are usually poor and generally secure financial aid from private sources, usually from fruit commission agents. Instances exist of contractors being considerably behind in payments to growers. Some growers also report that in bad years ill-financed contractors sometimes slip away quietly at night from the garden, leaving the fruit unpicked on the trees. In order to avoid such losses well advised growers now take care to ascertain the financial resources of the contractor, often making it necessary for the commission agent to stand as security for him. This has become an established custom with the majority of the Amritsar growers, and examples are also found in Ferozepore and Multan districts. This uncertain state of affairs along with other difficulties of the growers on account of which they have resorted to the current method of sale indicates that a better type of marketing system is needed. It is not out of place to mention here that the contractors, having no interest in the garden itself, and also being ignorant handle both the fruits and the fruit trees with little care. The method of picking the fruits as adopted by the contractors in general and particularly in the case of malta oranges is very crude. The fruits, as they are cut from the trees, are allowed to fall on the ground. Although these oranges do not show injury immediately after picking, (the skin being spongy) this practice certainly shortens the life of the fruit. It has also been observed in the markets that the fruits, particularly malta and sangtra oranges are harvested with fairly long stems for the purpose of decoration and making the fruit look fresh. These stems, however, possess many potential buds which would have produced new fruiting brush for the next crop, thus reducing the yield of the following crop. Losses such as these are more frequent in the case of careless growers. If the fruit growers were to take up the marketing of their own produce, they would avoid such harmful practices besides providing the consumers with sound and healthy fruit.

Certain other points which may be of some interest to the fruit growers and upon which effective improvement is needed—not beyond the scope of the grower—are enumerated below:—

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1. Market Gluts

Recent marketing surveys made on some of the fruits bring to light that due to uncontrolled and uneven distribution of supplies of fruit, markets get glutted at one time, and shortage is experienced at another time. Over supplies unnecessarily depress the market and lower the prices and cause low returns to the consignors. On the other hand in the period of scarcity the prices become prohibitive. Under the existing conditions, it is difficult to improve matters, but surely much can be done through collective action to avoid temporary gluts and scarcities through the regulation of the flow of supplies from the points of production. Not only this, but a larger quantity of fruit can be moved into consumption centres at a higher level of prices to growers.

2. Co-operative Marketing

In other provinces, for instance in Central Provinces, fruit growers associations have been formed only recently and have already taken up the marketing of the fruits of their members on a co-operative basis. For the first time, three wagons of Sangtra oranges of the Nagpur Fruit Growers' Association were sold in the Lahore market in 1936-37. The arrangements for the disposal of these fruits, however, were made by the Punjab Marketing staff. This year the above-named association anticipates to market a larger volume of fruit. There is no reason why Fruit Growers Associations in the Punjab should not work towards the similar end.

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THE PUNJAB FRUIT JOURNAL

THE FRUIT MARKETING SCHEME

—By—

K. L. KOHLI, M.A., L.S.G.D.,
Asstt. Secretary, Punjab Fruit
Development Board.

The services rendered at present by the middlemen to the fruit industry of the province are notoriously expensive, unsatisfactory and out of date. How to improve upon these conditions and to direct the Punjab Fruit Trade on modern lines and conduct it under hygienic and sanitary conditions have been some of the questions engaging the attention of the leaders of the Punjab Fruit Movement. The Punjab Fruit Development Board has been endeavouring to bring about the day when it is able not only to effect an even distribution of the Punjab Fruits in various mofussils of the province, but can build a substantial export trade.

The Board proposes, as a first step, to initiate its reformatory programme of fruit marketing by organising a modest fruit market at Lahore. This scheme, in due course, is proposed to be extended to various important mofussil towns of the province. The Local Government has promised as a result of the Board's representations to grant a lease of a compact central site outside Shahalmi Gate, Lahore. This will give a start to the proposed marketing scheme.

The immediate prospects of getting any financial assistance from any outside agency, municipal or otherwise, except that of a meagre grant from the Government, being very remote, the Fruit Marketing Standing Committee has recommended to the Board to meet the capital cost of construction of the market building and other incidental expenses out of its own limited resources. The organisation is thus confronted with the age-long problem of providing funds.

That there will be opposition from the clique-ridden fruit Arhtias and other vested interests, to all steps ensuring regulated continuous supplies of fruits and to measures taken to provide hygienic and sanitary environments for introducing modern grading and packing methods, cold storage facilities is not difficult to foresee. In addition to this initial difficulty is the important question of funds which will be needed for the gigantic reformative work. The problem of deviation of fruit supplies from the vicious circle of garden contractors to our markets may prove another gordian knot.

In a recent meeting of the Fruit Marketing Standing Committee, a suggestion was made that representative Joint Stock Company be floated under the aegis of the Board to provide requisite funds. The proposal

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though not seriously taken then, has immense possibilities. A pure private or public Joint Stock venture might have difficulty in raising the requisite funds in a reasonable time. But if a State-aided Fruit Marketing Joint Stock Syndicate as outlined hereafter is organised under the auspices of the Board it should not be difficult to raise Capital from the open market, which would not only be sufficient to organise the proposed fruit market at Lahore but many other similar markets in various important mofussil towns. It would be interesting to know that a similar organisation is already afoot in the United Provinces for the marketing of general agricultural produce under the auspices of the U. P. Government.

Below is given an outline of a scheme which envisages the organisation of a State-aided Fruit Marketing Syndicate:—

OUTLINES OF THE SCHEME

Name:—The new Company may be named and styled as The Punjab Fruit Financing and Marketing Board Limited.

Capital:—Although the Authorised Capital of the Marketing Board may be Rs. 5 lakhs, the Subscribed Capital need not be more than Rs. one lakh.

The Subscribed issued Capital of one lakh may be divided into **2,000 Ordinary Shares** of Rs. 50 each of which 500 ordinary Shares of Rs. 50 each will be reserved for the members of the Punjab Fruit Development Board, or those fruit growers who have fruit gardens of one acre or more.

Underwriters Commission:—The Underwriting Commission up to 5% of the Subscribed Capital will be permitted.

AIMS AND OBJECTS

The Marketing Board under the direct supervision of the Agricultural Department, Punjab, will be empowered to buy and sell fruits and fruit products mainly of the Punjab (though it will deal in fruits of other provinces as well), to accept them on a consignment basis and to do general "Arhtia" work.

For the above purpose the Marketing Board will organise its own Co-operative Fruit Markets in conjunction with Municipal Committees or otherwise. Such a Co-operative Fruit Market will be organised at Lahore in the near future. In selected thickly populated centres the Marketing Board will run its own Fruit Co-operative Agency Shops, so as to popularise Standardised Brands, packages and Grades of Fruits.

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The Rate of Commission and Interest:—Such rate of Commission and interest charges and other sundry charges will be leviable in the markets of the Board as approved by the Agricultural Department and the Co-operative Department, Punjab. Surely this will regularise and reduce the burden on the Fruit Growers and the consumers.

Advance Financing:—The machinery of the Marketing Board will not only market fruits and fruit products, but will also make advances to the fruit growers against the Standing Fruit Crops or the ready fruit brought in for marketing; but such Advances will only be made to shareholders, and in no case will exceed 10% of the estimated value.

Surely this will have a psychological effect in freeing the fruit growers from the clutches of garden contractors.

Propaganda:—The machinery of the Syndicate will also be utilised in conducting educative propaganda, advertisement and similar publicity for the cause of the Punjab Fruit Development Board. If need be a weekly bilingual Fruit Market Intelligence Bulletin, will be issued by the Board.

Government Assistance:—The Punjab Government's help may be requested initially for a period of ten years, and may take the following form:

(a) An annual Subsidy equivalent to 10% of the Paid-up Capital.

(b) Dividend on the Paid-up Capital may be guaranteed at 3% minimum.

(c) All appointments and dismissals of officers drawing above Rs. 100 per mensem will be subject to the sanction of the Punjab Government.

Management:—The Management of the Marketing Board will be conducted by a special Marketing Committee out of the Managing Committee of the Punjab Fruit Development Board. The Marketing Committee may consist of seven or eight Directors of which the Chairman and three other members shall be nominated Officials of the Punjab Government. Such officials might be the Fruit Specialist of the Punjab Government, Marketing Officer, Punjab and the Assistant Registrar Co-operative or other official.

The Marketing Committee thus constituted will be responsible for its day to day working to the Managing body of the Punjab Fruit Development Board.

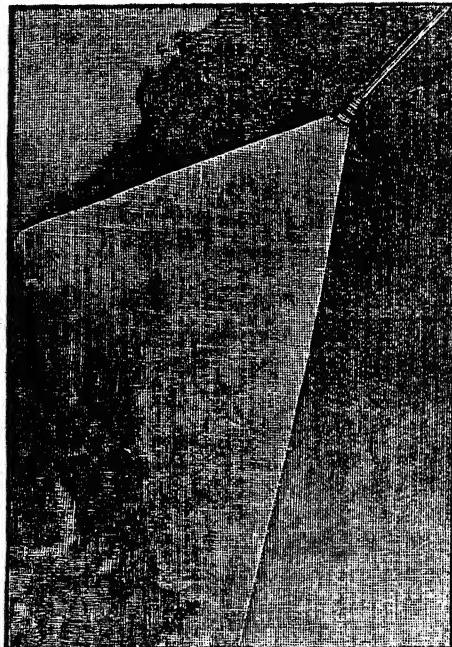
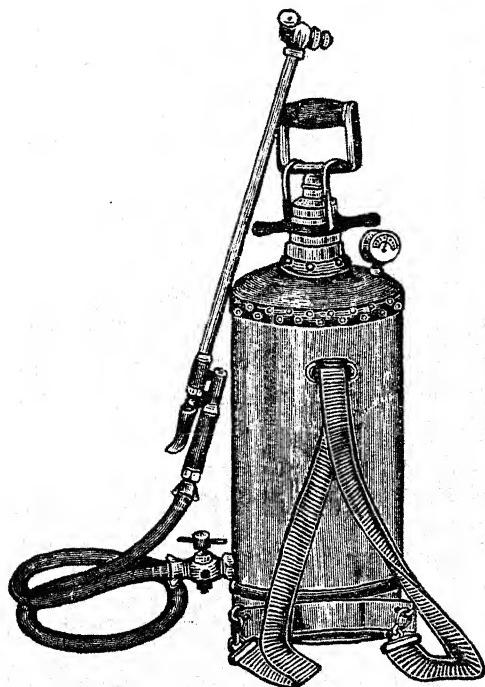
All shareholder of the Marketing Board will be treated 'ipso-facto' members of the Punjab Fruit Development Board.

Dividends:—In matters of dividends only shareholders of the Marketing Board will be entitled to participate.

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2½, Gallons Capacity made of Brass



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SEASONAL HINTS

—By—

L. AMOLAK RAM, B.Sc. (Agri.)

Fruit Section, Lyallpur.

1. Frost Protection: Winter season has set in and frosts are being experienced. Most of the fruit growers will have already taken action to protect their young plants from frost, but those who have not done so, may do it immediately. Young mango, Kagzi lime, guava, loquat, lichi, newly budded or grafted citrus and mango plants in the nursery, etc., are particularly susceptible to frost and should invariably be provided with shelter. In the case of garden plants, Sarkanda thatch all around the plant with a small opening near the ground on the south east side will serve the purpose. The opening on the south east side prevents suffocation and also lets in a certain amount of sunshine during daytime. The plants in the nursery beds should be provided with a sarkanda roof about 3 feet high from the ground. The most popular method of protecting young mango trees in Multan side is to make **Kaulas** around each tree, i.e., mud wall about 4 ft. high and 4-5 ft. in diameter with an opening on one side to let in water. This is covered over with sarkanda in winter when there is severe cold. This also protects young trees in summer against hot dry winds, as well as from cattle at the time of intercultivation. The initial cost may amount to -|8/- or so per Kaula but these Kaulas last for several years. Readers are invited to refer to the Agriculture Department leaflet No. 81 which deals with other methods of protecting trees against frost.

2. Planting Season would be soon at hand. Fruit growers are advised to go through the article "seasonal hints for planting new gardens" given in the January 1937 issue of the Fruit Journal and the departmental leaflets on the subject particularly Nos. 40, 41, 68 and 70. These publications deal very thoroughly with this subject. Growers will require plants either for extending their gardens or for filling in the gaps which may have occurred in the existing area.

It is always better to get the plants in the beginning of the planting season as later on weak and left over plants are likely to be supplied.

3. It is just the season for pruning and manuring of Fruit trees. This subject was dealt with in the article "Seasonal hints for improving old gardens" in the January, 1937 issue of the fruit Journal, which may be care-

fully studied. Trees in most orchards are under-nourished as they do not receive the requisite amount of manure regularly. Well rotten Farm yard manure is most useful but is not generally available in a sufficient quantity. Fruit growers are therefore advised to augment their supply by turning all their tree prunings, hedge trimmings, garden sweepings, etc., into compost a brief description of the method of preparation of which will not be out of place. These materials which are generally burnt or thrown away can be a source of handsome and regular quantity of valuable manure if taken proper care of. For this purpose pits 15 ft. wide, 2½ ft. deep, (length depending upon the amount of material available) should be dug up and filled with the aforesaid material in such a way that 9" thick layers of the compost material should alternate with 2" thick layers of farm yard manure. There will be three layers of each and the pit when filled will be 3" higher than the ground level. About 4 feet space should be left unfilled breadthwise on one side to allow for turnings. The heap should then be sprinkled over with water from the adjacent Khal provided for the purpose. Care should be taken to have no free water in the heap. After intervals of 10—12 days water may be sprinkled over the heap. Twenty to twenty-five days after the storage and when the heap has been moistened three times the heap may be turned over towards the vacant space kept for the purpose. As some shrinkage in the volume of the heap will take place, while turning care may be taken to keep the height again at 2½' but the length may be reduced. Again when the heap seems to be dry it may be moistened with water and again turned after 20—25 days. In this way it may require three to four turnings to complete the process.

In case of deficiency of farm yard manure, artificial fertilizers may be applied in conjunction with the same as discussed in a separate article elsewhere. Experiments on manuring of Citrus trees conducted by the Fruit Specialist Punjab over a period of several years have conclusively shown that application of artificial fertilizers with Farm yard manure invariably increases the yield of fruit.

4. Mark Your Heaviest Bearing Trees: Citrus fruits, viz., Malta, Sangtra, Grape fruit, etc., are nearing maturity. Fruit growers are advised to mark the heaviest bearing trees with coal tar and utilise budwood from only those trees for future propagation of nursery plants. The quality of fruits of various varieties or trees can be judged only at this time and the fruit growers would do well to enter brief notes to this effect in their note books or registers. It is not advisable to depend upon memory alone. The

fruit of blood red varieties of malta oranges may be kept on the trees till they develop red colour. These things are very simple but are the quickest and surest means of improving ones orchard.

5. Irrigation: In case of deciduous trees like peaches, plums, etc., that shed their leaves, very little irrigation is needed in winter. Even in the case of citrus, mangoes and other ever green trees, much less irrigation is required. Due to the cold weather the trees are in a dormant condition and require very little water. Withholding of water at this time will also result in increased production of fruit buds and flowers. The waterings should be shallow and should be given after three weeks or a month, in case of ever-green trees and six weeks or so, in the case of deciduous trees. Irrigation may be applied soon after manuring the trees, and then water should be withheld until the fruits have set, after which the trees will require regular irrigation. On the occasion of severe frosts, irrigation is beneficial in protecting trees from frosts.

6. Manure Nursery Plants: The citrus stock plants which will be budded in the following spring should be given liberal amount of manure and irrigation so that the sap in them may flow early and budding done in time. In the case of weak nursery plants, (stocks) by the time sap begins to flow and they become fit for budding, the buds on the parent trees sprout and hence it is very difficult to procure desirable type of budwood from these parent trees. If the stock plants in the nursery are vigorous and strong they become fit for budding (i.e., bark peels off readily) just when the parent trees in the garden from which buds are to be taken, are ready to give buds.

7. Root Pruning: If there are some citrus trees which are very vigorous in growth but are shy bearers they may be root-pruned. A brief description of the process of root pruning is given below:—

The soil round the tree should be dug out in a ring, leaving one foot of soil round the trunk untouched. The width of the ring of soil dug should be 3 feet and depth 9 inches. The fibrous roots in the dug out portion shuold be removed while the thicker roots (more than the thickness of lead pencil) are left intact. The trees should be left in this condition for a week after which the pit may be filled with soil well mixed with 1-2 mds. of well rotten manure. Irrigation should then be applied. By this process the tree will be forced to put on large number of flowers and set fruit.

8. Wind Break all around the garden is necessary, the importance of which can hardly be over emphasised. Most of the gardens are without windbreaks which is the main reason of excessive shedding of fruits in such cases. Fruit growers are advised to provide shelter to their trees by planting suitable windbreaks during the following planting season. Shisham, Mulberry, seedling mango, Jaman, Ber trees, etc., are some of the desirable trees for this purpose.

DO NOT FORGET TO FEED YOUR FRUIT TREES

YOUNG FRUIT TREES

not in bearing should
be given 2 to 6 lbs of

YOUNG FRUIT TREE FERTILISER

Analysing :

4·2 per cent Nitrogen
5·4 per cent Phosphoric Acid
8·0 per cent "POTASH"

half to be applied before the rains and half
after the rains

OLD FRUIT TREES

in bearing should be given
7 to 15 lbs of

OLD FRUIT TREE FERTILISER

Analysing :

3·5 per cent Nitrogen
7·2 per cent Phosphoric Acid
10·0 per cent "POTASH"

half to be applied just before flowering and half
just after harvest.

*Further information on the manuring of Fruit Trees may be
obtained from :*

THE OVERSEAS POTASH EXPORT COMPANY LIMITED.

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TOTAL WORKING CAPITAL AS ON 30th JUNE 1937

Exceeds	... Rs. 8,21,00,000
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M. L. TANNAN, General Manager.

NOTE ON THE VARIETIES OF APPLES AND CHERRIES
RECOMMENDED FOR CULTURE IN COMMERCIAL
ORCHARDS IN THE SIMLA HILLS

—By—

S. B L A K E,
Hillock Head Fruit Gardens,
Mashobra, Simla Hills.

The object of this note is to guide the prospective fruit growers in the Simla Hills in their selection of suitable varieties of apples and cherries for altitudes varying from, say 6,500 to 7,500 ft. Varieties have been selected from the point of view of market growers. A few words of advice are also offered about other kinds of fruit.

TABLE APPLES

The following are the early varieties which are ready for plucking in the latter half of June and for sale from the first week of July to about the end of July; these varieties do not keep longer than about six weeks after plucking and should be sold before they lose their crispness and flavour by long storage.

Red Astrachan. A fine, large, red table apple; variable in size, but of good shape; flesh white and crisp; refreshing flavour. Average about 5 to the pound. Very popular in season, but does not withstand the heat of the plains unless sent while still a bit hard. The writer plucked over 700 lbs. from three trees in his garden; these have been found to be regular bearers and free from blemish.

Lady Sudeley. A fairly large table apple: pale orange, striped red; flesh tender and juicy. About 4 to the pound. Does not keep longer than the end of July. Medium bearer but useful as an early variety, with which to vary sales.

The following variety of table apple is ready for plucking in the first half of July and will keep till the end of August in a fruit room.

James Grieve. A medium sized table apple, primrose, striped red, with white tender flesh, and pleasant sweet flavour. About 5 to the pound. Sometimes described as an early Cox's Orange Pippin. A good bearer and a very fine market variety.

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The following varieties are ready for plucking in the second half of July and will keep till early September.

Charles Ross. A cross between a PEASGOOD NONESUCH and a COX'S ORANGE PIPPIN: fairly large; pleasantly sub-acid flavour; a good bearer and recommended for market culture.

Washington. A medium sized table apple. Skin greenish-yellow with orange red flush. Flesh white, crisp and juicy. A good bearer and a general favourite.

In order to keep up a supply of apples till Christmas and even up to March the following are recommended.

Cox's Orange Pippin. Perhaps the best known table apple. Rich orange, bronzy, red; flesh tender, cream coloured, with a rich and pleasant flavour; will keep till the end of February and even to March, if well stored. A good cropper. Awarded a first prize in the Simla Fruit Show 1937.

King of the Pippins. Very similar to the above but not such a favourite. A good bearer. Awarded a prize in the Simla Fruit Show 1937.

Peck's Pleasant. An American apple; pale yellow, with red bluish on sunny side. A good bearer and keeps well.

COOKING APPLES

As an early variety with which to catch the market, Northern Spy is recommended. It cooks well but does not keep and the number of trees planted should depend on market available. As a mid-season cooking apple the Stripped Beefing (or Beaufin) is recommended. This was awarded a first prize in the Simla Hill Fruit Show 1937. The Blenheim Orange is another good bearer, the smaller fruit are good as table apples. As a late cooking apple the Sandringham is recommended. This was awarded a second prize in the Simla Fruit Show 1937. The smaller fruits also serve as table apples.

It is a great mistake to grow too many varieties of apples in a commercial orchard, varieties selected should be grouped.

- (a) for convenience in gathering the crop and,
- (b) for reducing the area over which a watch has to be kept, to scare off monkeys or other marauders, as the season advances.

C H E R R I E S

The demand for cherries is still strong in and around Simla, and as this fruit is perhaps the least sensitive to poorness of soil it can, with advantage, be planted in those sections of orchards where the soil is not rich enough for apples and pears. A good average price for cherries is still as high as Re. 1 a pound. Early varieties pay well as they catch the market at a time when demand is generally in excess of supply; i.e., about the middle of May. The following are good:

Guigne d' Annonay (black)

Governor Wood (white)

Bigarreau de Schreken (black)

and **Elton** (white).

N. B.—The white cherries are, of course, a very light red.

As mid-season varieties the following will do well;

Emperor Francis (red)

Kentish Bigarreau (red).

Late varieties are useful but there is a danger of their being damaged by an early monsoon if too late in ripening. The following are recommended as they ripen early in June and keep on till the rains break:

Geante de Heidelfingen (black).

Black Tartarian (black).

Cherries do not bear transport well and the number of trees planted should not, therefore, be greatly in excess of what the market available within a day's transport would justify.

PEARS, APRICOTS, PEACHES AND PLUMS

These fruits are difficult to market to even a short distance in the absence of a brisk local demand; the writer does not recommend planting more than a comparatively small number of each. The existence of a canning factory in the neighbourhood would, however, make all the difference and the possibility of such a development should be borne in mind. The varieties found to do well in the Simla Hills are numerous and a wide selection is open to fruit growers. The writer does not feel justified in specifying any one variety as particularly suited to local climatic conditions, and only offers the advice to plant early varieties of Peaches as these are less likely to be damaged by the rains.

Strawberries: Do well at an altitude of over 7,500 feet and have a ready if localised market. They fetch a good price of even

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as much as Rs. 1|8/- a pound and would be useful as catch crops during the earlier years in an orchard. They need water and failing a sufficient supply should not be cultivated.

Blackberries. These also do well and any good variety will more than pay for the labour involved in its cultivation. It is of no use growing the common semi-wild variety as it has no market.

Tomatoes. Botanically a fruit, and so mentioned here, tomatoes afford a very fine catch crop and would help in the early days of an orchard if a local market is available.

A few Spanish chestnuts may, if desired, be planted, if there is ample space. These trees are large and should be placed where they would not eventually overshadow other fruit trees.

Grapes and Figs. Have not proved a success at the altitude in question and are not worth planting for commercial purposes. Hot house culture would not pay its way.

[We are grateful to Mr. Blake for writing the above note which is indeed comprehensive and which embodies the results of trials of several hundred varieties carried out at the Hillock Head gardens, Mashobra for good many years.—Ed.]

READ

Bulletins on Fruit Industries of (i) EGYPT, (ii) PALESTINE, (iii) ITALY, (iv) FRANCE & SWITZERLAND

The PUNJAB FRUIT DEVELOPMENT BOARD, Lyallpur.

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IMPROVEMENT OF MANGOES IN THE PUNJAB

—By—

Mr. AMOLAK RAM, B.Sc. (Agri.),
Fruit Section, Lyallpur.

The chief mango growing districts of the Punjab are Gurdaspur, Hoshiarpur, Ambala, Jullundur, Karnal, Multan and Muzaffargarh. Some of the central districts, e.g., Amritsar and Lahore also grow this fruit to a certain extent, but it thrives best in the submontane tracts. Mango cultivation in the districts of Multan and Muzaffargarh is confined only to tracts along the rivers where the climate is favourable to mango growth.

2. There are some seedling mangoes of outstanding merit both as regards yield, and quality of fruit in the above-mentioned districts but as seedling mangoes on the whole are of poor quality, consequently bringing low returns, a constant import of grafted varieties from the U.P., Bombay Presidency, etc., has been built up.

3. Work in connection with the improvement of mangoes was taken up by the Department of Agriculture, Punjab, some years ago and grafted plants of Langra variety were planted in the Government garden at Lyallpur. These trees have flourished well and have borne fruit of excellent quality. Average yield of some 20 grown up plants of about 9—11 years age comes to a little over one md. per tree. The fruit sells at the spot @ -|4|- a seer fetching an income of rupees ten per tree or about rupees 500 per acre. The highest yield from a tree has been 4 maunds, 21 seers, which fetched an income of Rs. 45|4|- . The income from these trees would have been greater but for the fact that several thousand grafts are taken from them necessitating removal of a great deal of fruit bearing branches every year. Other grafted varieties of mangoes recently introduced are Bombay green, Alfonso, Malda, Fajri Kalan, Aman Dusehri, Samar Bahishat Ram-pur, etc. These are yet under trial at Gurdaspur and other experimental farms and will be given out to fruit growers when the results as to their success are obtained.

5. The Government nurseries at Lyallpur, Gurdaspur, Jullundur, Karnal and Muzaffargarh have been specially selected for mango propagation work. Nurseries at places other than Lyallpur have been only recently started with the inauguration of the Rural Reconstruction Scheme by the Government of India for the production of nursery plants on a large scale for supply to the public at a cheap rate. The Lyallpur Nursery has been

functioning for the past five or six years and has already sold to the public about 6,000 mango grafts. Of late, mango fruit shows have been started in the districts of Karnal, Jullundur and Multan, the chief mango growing districts of the Province. This has aroused a great interest among fruit growers and there is a healthy rivalry among them to produce and exhibit the best varieties available. It has also enabled the Fruit Section to locate the trees of outstanding merit from which grafts are being obtained for planting in the Government Experimental Garden at Lyallpur. The varieties which prove successful will be propagated and supplied to the public at cheap rates, in due course. It is gratifying to see that whereas in old gardens, 99% of the mango trees are seedlings of inferior quality, in the newly planted gardens, people are planting a large percentage of grafted mangoes of good quality.

RESEARCH WORK

Besides trial of varieties referred to above other experimental work on mangoes has also been started recently by the Fruit Section at Lyallpur which is briefly mentioned below:

1. Budding Experiments on Mangoes

The present practice of propagating mangoes of superior varieties by enarching is both expensive and cumbersome. It was considered advisable to try budding as a means of propagation. If it proves successful it will be a boon to the mango industry, as mango plants of grafted varieties can then be produced on a large scale at a very low cost. Preliminary trials on budding of mangoes in the months of April, May and June and with buds of different maturity have given encouraging results and it is intended to try it on a larger scale during the next 2-3 years.

2. Alternate Bearing of Mangoes

This phenomenon, i.e. bearing heavy crop in one year and light or no crop in the following year is to be observed in almost all mango orchards in India, and has been engaging the attention of Horticulturists for some time past and to solve this problem large amount of funds have been provided by the Imperial Council of Agricultural Research to the department of Agriculture Bihar and Orissa. Alternate bearing has been vaguely attributed to several causes without any scientific investigation. Remedies can only be suggested after a careful study of the phenomenon and its causes, and to find out the latter, a record of growth and fruiting habit of the Langra variety is being kept at Lyallpur for the last three years. Several hundred shoots, some of them bearing fruits and others not bearing were selected in different months and their growth

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recorded every week and other observations taken from time to time.

The data, thus collected, in the case of Langra Mango trees at Lyallpur indicate the following:

(a) Only such shoots are likely to bear fruit next year which do not bear this year. Only these shoots (i.e., not bearing fruit) make any extension growth. The shoots bearing fruit this year do not bear fruit next year.

(b) There is a marked correlation between fruit bud differentiation and the time of growth cessation in shoots. The shoots that stop growth early in the season bear fruit next year. But shoots continuing growth till late in the season (end of September) do not differentiate fruit buds and bear no fruit next year.

(c) Shoots bearing fruit do not make any extension growth in that season. This is due to the fact that the fruit is terminal and no vegetative growth is possible so long as the fruit is on the tree. These shoots in the following season do not consequently bear any fruit.

(d) Removal of floral shoot (inflorescence—a bunch of flowers) forces the shoots to make an extension growth in the fruiting season. The behaviour of such shoots in regard to their bearing next year depends upon their growth features, as mentioned at (b).

Further research on this problem is in progress and in due course it may be expected to regulate fruiting every year by suitable cultural practices.

KHALSA COLLEGE NURSERY AMRITSAR.

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KHALSA COLLEGE, AMRITSAR

THE PUNJAB FRUIT JOURNAL

ECONOMIC TUBE-WELL IRRIGATION

—By—

K. L. KOHLI, M.A., L.S.G.D.,

Asstt. Secretary, Punjab P. C.

Fruit Development Board.

From one end of the province to the other fruit growers are clamouring for better irrigation water facilities. Extension programmes of most of the orchards are at a standstill. Leave alone adequate supplies of water, sometimes fruit growers find it difficult to get even their bare minimum requirements. The Canal authorities, in spite of their best intentions have so far not been able to grapple with this tough problem in a satisfactory manner. To avert the setback which the developing fruit industry would otherwise get, it is high time that measures were taken both by official and non-official agencies to supplement canal-irrigation with tube-well irrigation in areas where water-level is not exceptionally low or water otherwise unsuitable. With this end in view quotations from some of the leading Engineering firms for installation of tube-wells suitable for fruit gardens were asked for. One of these firms have quoted the figure for installation of a tube-well fully equipped and fitted with an oil engine suitable for irrigation of a garden area of 20 to 25 acres at Rs. 1,500 to Rs. 2,000. For an average fruit grower to manipulate a tube-well is a matter of only a little practice. Authenticated data regarding the cost of running a tube-well for horticultural operations is not as yet available for the Punjab. But it is roughly estimated that the running cost per irrigation per acre would not exceed Re. 1 to Rs. 1-8. This figure compares very favourably with Canal irrigation charges. The running cost would be even less in areas where hydro-electric current is available. Leaving the above question of comparative cost, one distinct advantage in tube-well irrigation is that water can be made available at will.

Taqavi Loans

It may further be added for the information of the fruit growers that the Department of Agriculture, Punjab, is in a position to recommend financial assistance to all bona fide cases. Terms of repayment too are fairly convenient. For free expert advice in the matter kindly communicate with the Agricultural Engineer, Lyallpur.

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RECENT DEVELOPMENTS IN THE CANNING OF FRUIT JUICES

—By—

Dr. G. S. SIDDAPPA, M.A., Ph.D., A.I.C.,
Fruit Section, Lyallpur.

The preservation of fruit juices with all their natural flavour and aroma is a problem of first rate importance and in recent years it has attracted considerable attention. The vitamin content, the alkalizing properties and the mineral content of fruit juices make them one of the most important factors in human nutrition. Although considerable amount of work has been done with regard to the retention of the natural flavour of fruit juices, especially the citrus juices, the problem still requires further investigation. In the following paragraphs is given a summary of a paper by S. Henry Ayers of the Crown Can Company, Philadelphia of a very ingenious method known as the Stero-vac Process for the preservation of citrus juices (Fruit Products Journal, October 1937, p. 41). The process although based on the principal of flash pasteurization of juices differs from it in certain essentials as will be discussed in this paper.

Quality of Fruit

It is a well-known fact that at best any process cannot improve the original quality of the fresh juice. It is, therefore, essential that for the preparation of citrus juices, freshly picked, tree ripened fruit, free from any unusual defects should be used and they should not be held for more than 24 hours after picking. To secure uniformity it is often necessary to blend juices and thereby allow for variation in size of fruit or the influence of soil factors.

Extraction of the Juice

Although various methods have been tried to extract juice from citrus fruit, the well-known revolving burr method where the cut half of the fruit is pressed against a revolving spindle has come to stay. But in the Stero-vac process as used by the Sun Dive Company Inc. the select fruit is passed through a grater which consists of two horizontal revolving discs of about 4 feet diameter covered with stainless steel fillet. Suspended above each disc is a rigid spiral which is stationary. As the discs rotate at a speed of about 100 R. P. M. the fruit is thrown by centrifugal action against the stationary spiral where its surface is punctured and grated by the fillet and the oil relaxed from the skin. A fine spray of water washes off the grated peel and oil. The grated fruit then passes through a conti-

nuous press which consists of two heavy discs revolving in the same direction and at the same speed and the pressed juice flows into a stainless steel tank.

Finishing the Juice

The extracted juice flows into what is known as a 'finisher.' This is a mechanical strainer of fine mesh which removes the pulp and seeds. It is important that the rag and as much of the cell tissue as possible should be separated as they add to the juice, factors which later on affect the keeping quality of the preserved juice.

Daeaeration of the Juice

Most of the undesirable changes in flavour and quality that occur in pressed juices are mostly due to oxidation and it is therefore desirable that the oxygen must be completely removed from the juice. The amount of oxygen present in the juice varies with the method of extraction, reamed juice containing considerably more than pressed juice. Its removal must be quick and thorough and it must be kept out during the subsequent processes. In the Stero-vac process the finished juice is passed through a deaerating unit which consists of a series of pipes enclosed in a steam chest connected to a condenser. The juice is drawn through these pipes which are surrounded by hot vapour at a vacuum of 28 inches and it actually boils under this high vacuum. As it leaves the chest under high velocity all the oxygen and a part of the dissolved carbon dioxide is removed. A definite amount of water also is removed at this stage and this has an important bearing in the later stages. The amount of water removed is regulated.

Filling the Juice

As the juice leaves the deaerating chamber, it enters another chamber where in an atmosphere of an inert gas like nitrogen, it is broken to atmospheric pressure and filled directly into cans. Plain cans are used for grape fruit juice and lacquered cans for orange juice.

Stero-Vac Process

In this process, unlike in most other flash-pasteurising systems, the juice is flash-heated in the final container in the practical absence of air. This is done by injecting steam directly into the juice in the can through a special valve in the end of the can, the valve being forced later against a special sealing compound. The juice in the can is at a temperature slightly less than 100° F. After seaming the valve ends, the cans pass through a

short exhaust where the temperature is raised to 110° F and then to the Stero-vac machine. This machine consists of a turret carrying headers through which vacuum and steam are applied and the turret revolves in a vertical plane so that the cans are turned completely during one cycle of its revolution. Vacuum is applied first so that the juice practically flash boils under the high vacuum and the oxygen is removed from the head space in the can. Steam is then injected after cutting off the vacuum so that the juice is heated quickly by agitation. At the end of three quarters of a complete revolution of the turret, steam is cut off and the sudden change in pressure closes the valve immediately. The complete cycle on the machine is about 10 seconds with approximately 8 seconds of steam injection when the temperature of the juice is raised from 110° to 210°. The water lost in the deaerating unit is replaced by the condensed steam.

Cooling the Cans

At the end of the Stero-vac process the cans are cooled immediately by a spray of water to a temperature of about 90 to 95° F, dried and packed.

In the Stero-vac system the entire process from start to finish lasts for about five minutes only and is continuous. The method permits of flash heating to high temperature sufficient to destroy all enzymes without changing the flavour. Since the heating is done in the practical absence of oxygen the vitamin C content is not affected markedly and its retention during the storage is facilitated.

The Stero-vac system has been successfully employed for the preservation of various other juices as well. Tomato juice processed by this method is claimed to have an uncooked flavour. Pine apple juice does not undergo any colour change during storage. Even fruits retain their natural flavour and texture. Vegetables like peas string beans, etc., require a cycle of about 20 seconds in this system of processing. In short this system promises to have great possibilities to the canning industry.

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A NOTE ON FRUIT BREEDING IN INDIA

—By—

S. S. BHAT, M. Ag.,
Horticulturist to Government,
Baroda State, Baroda.

History:—Research work on Indian fruit trees on modern lines dates back to the nineties of the last century. During the last about half-a-century, this research has been confined mostly to the introduction and acclimatisation of new varieties into the locality concerned, and certain problems of propagation and culture. Fruit marketing and preservation have received but little attention, and that too during the last decade or so. Very recently, however, research work on Indian fruits is being intensified, through the inspiration of the Imperial Council of Agricultural Research, and fruit research stations are being established almost in every Province of India.

Difficulties in Breeding:—The evolution of new varieties and the improvement of the existing ones is not so easy to be accomplished in the case of fruits as they are in the case of many short lived crops as for example cereals. Improvement of crops by selection takes about six generations, and requires thousands of individuals to be carefully handled and thoroughly studied, in order to be effective. This would only bring us to a stage, when certain characters would be considered to be but stable. The evolution of new varieties or strains may then take several generations more for the evolution of new varieties by combining the stabilised characters through hybridisation. This means that to achieve something which may be nearly effective, it would take ten generations of any crop. In the case of cereals and other short-lived annual crops, the period for effective work may extend to ten years in the first instance. But in the case of fruit trees, the life period of which, even up to the first bearing, is not less than five to ten times that of the cereals, a period of a hundred years may be considered to be moderate. Of course, in fruits like the banana and papaya, a much shorter time may be sufficient.

The question of space for growing the minimum number of individuals necessary to be handled in breeding, and the expenses involved in cultivation, labour and scientific observations needed for such work are also very huge.

These facts which seem to present very great difficulties in undertaking the work, have pushed back the consideration of fruit breeding, and

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have brought easier and more superficial problems to the forefront in the esteem of the workers. For every scheme launched, the tendency seems to be to obtain the results as soon as possible and to "show something" within a short space of time. The possibility of vegetative propagation has indeed helped this tendency considerably in the case of fruit trees. Exploring new varieties from unknown wilds of Nature has also largely contributed to this end. All the same, the original question of attacking the existing types and their known varieties in the case of fruit trees, with a view to improve them as well as to evolve new ones, seems to persist.

Work Done in Other Countries:—In more advanced countries, where work on fruit trees has progressed for a considerable number of years, problems of fruit breeding have received a good deal of attention. In a recent account of the "Accomplishments in fruit breeding by State and Federal experiment stations" in the United States of America, it is stated that "in the year 1935, 32 State and 13 Federal Stations were actively engaged in work on fruit breeding." 18 of these stations have between them so far, named and introduced 449 new varieties, 321 of which have come out since 1920, and the introductions cover more than 40 kinds or types of fruit. This is of course preliminary to actual breeding work, which is progressing side by side with the collection of varieties which form the basic material for further work. In order to achieve the best results, it is suggested that the tendency to release promising new types before they have been fully tested should be checked and the various phases of breeding projects should be co-ordinated, through the active co-operation between the workers at the different stations concerned.

It would be interesting to note that the breeding of the well-known Gros Michel variety of banana with a seeded type has resulted in the evolution of a strain, which is highly immune to the deadly Panama disease in the West Indies. This new type which is named I. C. 1 (Imperial College of Tropical Agriculture No. 1), closely approaches the original Gros Michel in the quality of its fruits, and opens out a very great future for the banana industry of that country.

Problems in India:—In India the problems related to fruit trees which seem to present themselves for solution through breeding are many indeed. The periodicity of bearing in mangoes, though apparently a physiological phenomenon, seems possible to be remedied by the evolution of a constantly heavy bearing type or types, by breeding. The sterility of certain varieties of grapes, and their consequent shy bearing nature, causes a

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good deal of economic loss to the country. The possibilities of improving the sterile Pandhari Sahebi grape by crossing it with the Prolific Bhokari type is indicated by Cheema in Poona. The very highly splitting nature of papaya may be remedied by a careful combination and breeding of its characters, and then by maintaining the resultant combination unblemished through preventing cross-pollination. The selection of high quality strains of guava and pomegranates and their spread would also benefit the growers of these fruits immensely.

One of the problems of great economic importance seems to be to evolve a type of banana which may resist frost. As it is, varieties like the Basrai are known to be highly susceptible to damage by frost or low temperatures than many other varieties of inferior quality. This fact precludes the former from being grown successfully in areas which are liable to the occurrence of frost though occasional, in spite of their high quality. Attempts to introduce them to the Central and Northern parts of India have not met with any success. The combination of the high quality of fruit with the resistance to frost in banana by hybridisation may be taken to open out a very extensive field for its cultivation, not only in this country, but even abroad, and would surely merit the expenses and time involved in the work.

Conclusion:—While therefore problems of easier solution, such as those related to propagation, cultivation, marketing and preservation, may be tackled in all their aspects, the evolution of new varieties and the improvement of the existing ones should receive their due attention. The facts that they would take a very long time to yield results and involve huge expenses to be effective need not deter the country from undertaking work on them, because it may be that the results, when achieved, will have deserved all the time and expenses incurred on them. What is wanted seems to be extensive and complete fruit breeding stations, highly qualified and efficient batch of workers, and more than all, a definite and well conceived policy which should not be allowed to be digressed from with the change in the workers. Funds should be liberally provided for this work, and no exhibition of too great a hurry for the results should be put up by the authorities in control.

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IMPORTANCE OF COLD STORAGE

—By—

Dr. HARBANT SINGH, Ph.D.,
Fruit Section, Lyallpur.

In spite of a large volume of trade in perishable foodstuffs no systematic storage of such commodities is practised by merchants in this country. Fruits vegetables, meat, fish, eggs, milk and such other commodities are stored in ordinary godowns and shops with no arrangements, worth the name, for sanitation, ventilation, light and regulation of temperature and humidity. Large quantities of these foodstuffs go to waste simply because of lack of facilities for judicious marketing. No attempt is made to create a special demand in the public by either advertising or offering these commodities in an alluringly fresh form. Fruit is indiscriminately dumped in the open markets during the season and in a few days the rush is over. Under this system the producers get ridiculously low prices, because of a glut in the market, and the consumers get that particular commodity for a very limited period. In many cases the question of supply, far outstripping the demand, is so acute that the producer is lucky if he can realise the cartage and other incidental charges for marketing and surrender his produce into the bargain.

The immense potential importance of Cold Storage and refrigerated transport in the economic life of our country has not been realised generally. It holds out bright hopes of a general rise in Agricultural prosperity and a corresponding improvement in the standard of living. The great advance made by many enlightened Agricultural countries with the advent of Cold Storage must be seen to be realised. Countries like Australia, Canada, United States of America and Argentine owe their prosperity to Agriculture and in recent years all these countries have been helped by Cold Storage facilities in marketing their produce in distant lands. Large amounts of foodstuffs are either shipped direct to consumers markets in refrigerated holds or are stored in refrigerated warehouses in season and steadily released as required. By this means a glut in the market is avoided and the marketing period is extended over a reasonably long time. The results are beneficial both to the producer and the consumer—the producer gets a reasonable price for his produce, and the consumer is assured of a steady supply of fresh perishable commodities at moderate prices.

Thousands of tons of fruit are produced annually in the Punjab, but a fairly large part of this produce goes to waste. Our problem is not "how

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much we produce," it is "how much we can market profitably." Consumption of fruit in the Punjab clearly shows that there is no over-production; on the other hand there is enormous under-consumption. Only one family out of every ten in the towns and one in a hundred in rural areas really consume reasonable quantities of fruit. This state of affairs is partly, no doubt, due to the prevalent poverty, but quite a large share of responsibility lies with bad marketing. Good fruit is sold at such exorbitantly high prices that a person of average means cannot afford to take some home for his family. He has, however, the good sense to refuse to buy the bad stuff.

The only remedy and hope appears to lie in Cold Storage and it is to be hoped that merchants will rise to their responsibility and help Agriculture. By this means they will not only be making more money directly; a reasonable rise in Agricultural prosperity is sure to reflect in good profits for them. Systematic Cold Storage not only brings reasonable prices to the producer by preventing a glut in the market and extending the marketing period, but also provides opportunities for increased employment and a proportionate increase in prosperity.

BELIEVE IT OR NOT

1. PALESTINE with an area only about $\frac{1}{7}$ th of the Punjab and a population only 5% of the Punjab has about 150,000 acres under fruits.
(ii) It exported in 1934 about $3\frac{1}{2}$ crore rupees worth of oranges alone to foreign countries.
2. ITALY, with an area and population of about 20% and 77% respectively more than that of the Punjab, has got 1.38 crore acres under fruits and mixed farms, and the garden produce constituted about Rs. 26 crore alone in 1932.
3. FRANCE with an area and population about 115% and 75% respectively more than that of the Punjab, had total production of wine amounting to 149 crore gallons in 1934.
4. EGYPT with a population of about half that of the Punjab earmarked an annual budget of over fourteen lacs of rupees for the development of its Horticultural Department.

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THE HINDUSTAN-TIBET ROAD

[The following is the text of the forwarding letter and the memorandum of the Kotgarh Fruit Growers' Association, which is being circulated to all members of the Punjab Assembly.—Ed.]

The Punjab Provincial Co-operative

Fruit Development Board,

Punjab Agricultural College, Lyallpur,

10th October, 1937.

Dear Sir,

In the past you have always championed the cause of development of fruit industry in the province, I am, therefore, taking liberty of inviting your attention to the question of construction of Hindustan-Tibet Road for controlled motor transport of fruits and other hill products—a question the solution of which would have a far reaching effect on the development of fruits and vegetables in Simla hills.

Poverty of inhabitants of the Simla hills is proverbial, but nature is always ready to compensate with her bountiful returns. Some enterprising gentlemen encouraged by a big drive by the Agricultural Department for encouraging new plantations, have begun to grow fruits and vegetables like apples, pears, cherries, potatoes, tomatoes, peas, etc., in abundance. Apples of Kotgarh in Simla Hills are unsurpassed in quality in the whole of India, Potatoes, peas and chillies of Simla hills are also matchless in quality. It therefore goes without saying that the economic position of the people can be greatly improved.

At present mules returning from Rampur and Bushahar are the only means of transport to Simla which are not only awfully expensive, but also irregular because of scarcity of mules. Prices fetched in Simla for potatoes, etc., are sometimes so ridiculously low that the returns do not cover even mule charges. There is no need to give further evidence regarding the urgent need to replace this ante-diluvion means of transport with comparatively cheaper motor traffic. The salient points regarding the proposed beneficent undertaking are enumerated in detail in the memorandum submitted by the Secretary, Kotgarh Fruit Growers Association on the subject, which I am forwarding herewith in original, for your consideration.

In the name of hundreds of silent fruit growers and zamindars of Simla Hills in general and of Kotgarh Ilaqa in particular, I urge you to take

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up this noble cause and see that a satisfactory legislative measure to this end is pushed through in the autumn session of the Punjab Legislative Assembly.

Yours faithfully,
LAL SINGH, (Sardar Sahib),
Honorary Secretary, Punjab,
P. C. Fruit Development Board,
Lyallpur.

MEMORANDUM

At the meeting of the Kotgarh Fruit Growers' Association held in Simla on September 23, 1937 it was resolved that the Fruit Development Board Punjab be approached with the earnest request that it move the proper authorities for the opening of the Hindustan-Tibet Road for properly controlled motor transport of fruits and other hill products. It submits that this step is essential for the following reasons:

- (a) That due to the strong and active encouragement given to the laying out of new plantations during the past few years by the Agricultural Department of the Punjab Government a very large number of young orchards have been planted and have now begun to come into bearing.
- (b) That as a consequence of the above, the mules returning from Rampur Bushahar, which in the past were sufficient for the carriage of fruit of the old established orchards, are no longer able to carry to Simla more than a fraction of the greatly increased crop now being produced.
- (c) That as a result of this situation fruit growers, in their desperate need of transport, are forced to bid against each other for the few available mules, with the consequence that mules rates are forced up to such levels that, even for the cases which get to Simla, a large part of the profit which would go to the growers is eaten up by mule hire. Also, because the mules are not even now sufficient at any rate, large quantities of first quality desert fruit cannot reach the market during the Simla season, and becomes a dead loss to the growers.
- (d) That unless a solution of the transport problem is found, each succeeding year will see a progressively great wastage and loss, as the output of the new government encouraged orchards increase.

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- (e) That the inevitable consequence will be that as a result of the intensive propaganda for the extension of fruit growing, both old established orchards and new growers will be ruined.
- (f) In view of the above facts the association very respectfully submits that since the present critical situation is largely the outcome of governmental encouragement, it is only justice that the authorities should assist in the solution of the problem, and that they owe this not only to those who have become growers on their encouragement, but to the old established orchards which will be otherwise ruined.

The Kotgarh Fruit Growers' Association desire in this connection to bring the following points also to the attention of the Fruit Development Board:—

- (1) That the introduction of motor transport would not involve the construction of a new road. The Hindustan-Tibet Arterial Road No. 20 runs from Simla through Kotgarh. The distance covered is fifty miles. The road is even now often used by officials and others with special permission and quite large touring cars come frequently from Simla to Kotgarh.
- (2) For a number of years motor transport service has been in use for the fruit growers of the Kulu valley, although the road there is only about nine feet wide and must pass over bridges that are frequently washed away by floods.

The road between Kotgarh and Simla, on the contrary is subject to none of these difficulties. It is nowhere less than twelve feet wide, and on the whole between thirteen and fifteen feet in width. It is all on the same general level, with good gradients, and does not have to pass over any bridges or rivers. A certain amount of metalling would be required at a few points, but we understand from engineers that the expense involved would not be great, and that if a small impost per maund were placed upon goods carried, it would in a short time pay for its improvement and before long even yield a profit.

The association feels that in view of the above it is not fair that they should be deprived of this essential facility, when the growers of Kulu are enjoying it—especially when it is a question of its being the alternative to their economic ruin as a consequence of the policy of encouraging a great extension of fruit-tree-planting by the authorities.

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(3) Lastly the association submits to the consideration of the fruit Development Board that the policy of encouraging extensive planting of fruit trees pursued of recent years by the authorities will mean the economic salvation of the poverty stricken and backward hill area, if the transport problem is solved. The Simla hills have always been an economic liability to the Province, but by opening them up for motor transport so that the products of the hills can reach Simla and the plains at a cost and with a regularity that leaves room for profit to the hill people, the situation can be reversed, and the way open to a modest prosperity. The association believes that at the Hill Fruit Shows of these last two years it has demonstrated to the authorities that these hills are suited to grow—and are actually producing—the finest apples in the country, and it looks to the authorities to come to its aid at this critical juncture. In the light of the facts stated above it is sure that the Board will appreciate that the question raised is one of life and death to Kotgarh and adjacent growers and that in using its influence towards securing the needful the Board will be rendering a great humanitarian service to a needy area, and helping to enhance the wealth and prosperity of the Punjab.

Forwarded by
(Sd.) SATYANAND STOKES,

Secretary,

The Kotgarh Fruit Growers' Association.

A REVIEW

"THE GARDENER."—Messrs. Pestonjee P. Pocha and Sons of Poona are considered as leading nurserymen, seedmen and specialists in gardening. Their latest venture is the publication of the "Gardener," the appearance of which is yet another proof of their thriving success. We congratulate the management of our new contemporary on the excellent start they have made. From the first three issues which are before us it is evident that Messrs. Pocha's are earnest enough to popularise gardening as a hobby as well as a business of the country. Every issue is really a treat to the eye delightfully got up and well illustrated as it is. The annual subscription for customers of "Pocha's" is Re. 1 only, while for non-customers, it is Rs. 2.

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SOME MINOR ECONOMIC CROPS —

—By—
R. S. JAI CHAND LUTHRA, I.A.S.

For several years the prices of staple crops like wheat, cotton, etc., have declined a great deal and zamindars have been seriously considering if they should reduce the area usually put under them and devote some of it to more remunerative crops. A number of progressive landlords have keenly asked what new crops could be suggested in order to supplement their income. In this connection it must be borne in mind that if any special crops are cultivated, they must be limited to small areas, so that their produce does not exceed demand and danger of glutting the market and slump is avoided by such judicious forethought. Some crops of this category command good market and fetch high prices and would be very helpful to farmers in giving a handsome return for a comparatively small outlay. The following are some of the important plants of this kind and they can be tried in the hills and plains:—

FOR PLAINS

English Name	Vernacular Name	Botanical Name
1. Coriander	Dhania	<i>Coriandrum sativum.</i>
2. Fennel	Sonf	<i>Foeniculum vulgare.</i>
3. Omum	Ajwain	<i>Carum copticum.</i>
4. Dill	Soya	<i>Pseudum graveolens.</i>
5. Celery	Krafas	<i>Apium graveolens.</i>
6. Henbane	Khurasani Ajwain	<i>Hyoscyamus muticus</i> and <i>H. Nigh</i>
7. Rosha grass	Telia ghas	<i>Cymbopogon martinii.</i>
8. Liquorice	Mulathi	<i>Glycrrhiza glabra.</i>
9. Isabgol	Isabgol	<i>Plantago ovata.</i>
10. Flea seed	Vilayati Isabgol (French)	<i>Plantago psyllium.</i>
11. Lallementia	Tukham Langa	Lallementia Royleana.
12. Cassia	Chaksu	<i>Cassia absus.</i>

FOR HILLS

1. Belladona	Suchi	<i>Atropa belladonna.</i>
2. Teasel	—	<i>Dipsacus fullonum.</i>
3. Pyrethrum	Pisu-buti	<i>Pyrethrum cinerarifolium.</i>
4. Rhubarb	Rewand chini	<i>Rheum officinale.</i>
5. Podophyllum	Bankakri	<i>Podophyllum emodi.</i>
6. Valeriana	Mushakbala	<i>Valeriana Wallichii.</i>

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CORIANDER.—It is an important condiment, and there is a great demand for it in India and abroad. It is sown in October and matures in April. It yields on the average about 10 maunds of seed, which sells at present at Rs. 6 to Rs. 7 per maund. Some selections have been produced by the Department of Agriculture, yielding as much as 15 to 20 maunds per acre. "B.S.M." selection is the best of the new varieties.

FENNEL (Sonf).—It is another valuable condiment. The crop is sown in October and matures in April-May, yielding on the average 12 maunds per acre. It sells at present at Rs. 7 to Rs. 8 per maund.

AJWAIN.—It is an important essential oil plant. The seed yields an oil from which Thymol is extracted. There is good scope for both internal and foreign trade in this crop. Efforts are being made to produce high yielding varieties containing a high percentage of oil. The crop is sown in October and ripens in April-May, yielding an average of 8 maunds of seed per acre. Its price is Rs. 6 to Rs. 7 per maund.

DILL.—The seed of dill is mostly used in medicine for the manufacture of dill water. It is sown in September-October and matures in March-April, yielding from 8 to 10 maunds of seed per acre, selling at Rs. 5 to Rs. 6 per maund.

CELERY.—This plant is little known in this country, being grown only by Europeans for use as salad. However during the last few years, there has grown up abroad a demand for its seed, and it is now extensively grown in the Saharanpur, Ambala and Amritsar districts, and large quantities of the seed are exported from these places. Some time ago it was selling at Rs. 80 to Rs. 100 per maund. The present rate is about Rs. 25—30 per maund.

The crop is grown like Ajwain. It is sown in September and matures in April. Its average yield is 8 maunds per acre.

HENBANE (*Hyoscyamus*).—It is a medicinal plant. Its leaves and seed are used for various preparations both in pharmacopoeial and in indigenous systems of medicine.

The plant is grown from seed which is sown in nursery in September-October. Seedlings are transplanted when 2-3 inches high. The green branches are cut in January just when flowering begins. These are dried in the shade and then used for making various preparations. The yield of seed is about 4-5 maunds per acre and it sells at Rs. 7 to Rs. 8 per maund.

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There are two kinds of this plant. *Hyoscyamus muticus* yields a higher percentage of Hyoscyamine. It has been acclimatised at Lyallpur and can be successfully cultivated.

ROSHA GRASS.—It is a perennial grass. An essential oil called palmarosa oil is extracted by distillation. The grass has been grown on a large scale (about 230 acres) on a Government Farm near Jaranwala.

It yields 15 to 20 lbs. of oil per acre, which sells at about Rs. 3-4 per pound. The oil is used in the manufacture of perfumes and toilet soap. It contains about 90 per cent germoile. The oil is mostly exported to European countries. The grass is ready for distillation in about one year after planting, and continues to give annual crops of mature grass for many years. It is distilled at the flowering stage in October-November. The grass is easily grown from seed sown in March-April, on ridges 2-3 feet apart.

LIQUORICE (Mulathi).—This plant is a recent introduction in this country. Its roots are important as a medicine. The plant has been acclimatised in the Punjab plains. It is easily raised from root cuttings planted in February. It takes 3-4 years for the roots to develop. They are dried and cured before being marketed. About 30 maunds of dried roots are obtained from one acre.

ISABGOL (a mucilaginous seed).—It is a well-known seed of great medicinal value and is very commonly used as laxative particularly in dysentery. Of late there has developed a flourishing foreign trade in this seed, with the result that it is being cultivated in various parts of India.

The seed is sown in October. The crop does not require much looking after or irrigation. The seed matures in March, and the yield is about 5-6 maunds per acre. Its present price is Rs. 8 to Rs. 9 per maund.

There are two more crops of this kind, yielding mucilaginous seed. These are:—

1. French plantago.
2. Lallementia.

They can also be grown profitably.

Recently a special bulletin on "Cultivation of Some Important Drugs in the Punjab" has been published by the Department of Agriculture, Punjab. It should be consulted for obtaining detailed information regarding methods of cultivation, etc., on the plants mentioned in the article and others. The price of the bulletin is annas ten only, and can be had from the Professor of Botany, Punjab Agricultural College, Lyallpur, or the Superintendent, Government Printing Punjab, Lahore.

HORTICULTURAL KNOWLEDGE FROM FAR AND NEAR.

CITRUS MANURING—ITS EFFECT ON CROPPING AND ON
THE COMPOSITION AND KEEPING QUALITY OF ORANGES

—By—

F. G. ANDERSEN,

Journal of Pomology

and Horticultural Science,

Volume XV, No. 2, July 1937

The Primary object of the work reported here was to determine the effect of the most common artificial fertilizers used in citrus orchards and their influence on the quality composition and keeping quality of oranges. An orchard of approximately 2,500 Washington Navel orange trees on the African Realty Trust estate in the union of South Africa was selected for experiment. The soil of the orchard was conducive to normal growth of oranges. Phosphorus, Potash and Nitrogen were applied separately and in different combinations in the form of super phosphate, potassium sulphate and ammonium sulphate respectively.

Data. The fruit from each tree in every plot was harvested, counted and weighed separately. The circumference, considered to be a satisfactory index of growth, of each tree was measured every year. As fruits were cut for juice extraction the thickness of rind was measured at one point on the cut surface. A chemical analysis of the juice obtained from fruits from different plots was carried out and the percentage of various ingredients determined. The keeping quality of the fruit was determined by placing the fruit in cold storage for one month, after which it was moved to room temperature and examined for wastage. The data thus compiled was statistically analysed and the following results obtained.

1. Effect of Different Fertilizers on the Number of Fruits

The outstanding result of these treatments is the marked effect of Nitrogen application in increasing the number of fruits. Applications of more than 2 lbs. of ammonium sulphate per tree did not give demonstrably better results. Similarly the application of Nitrogen in two doses did not reflect in an increased crop over the same amount applied at one time. Potash and Phosphorus applied singly or combined did not affect the crop appreciably. An outstanding feature of these results is that contrary to common belief, the leguminous cover crop (Sann hemp, 10 lbs. and Iron Cowpeas, 10 lbs. per acre) did not affect the crop favourably and a tentative con-

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clusion is drawn that such a crop does not always increase the nitrogen content of the soil.

2. Effect on Growth of Trees

There appears to be no appreciable difference in the general condition and the circumference of the trees due to differential treatments during any of the five years. The controls were as good as the treated trees and this could only be explained on the assumption that large amounts of food material were available for vegetative growth in the absence of heavy crop due to nitrogen deficiency.

The increase in the number of fruits in the case of trees supplied with Nitrogen cannot be ascribed to a greater increase in the size of these trees over control; for it is seen that trees receiving nitrogen did not show increase in size over control.

3. Effect on the Weight of the Crop

Nitrogen increased the weight of the crop due to an increase in the number of fruits.

4. Effect on the Size of Fruits

There was no appreciable increase in size which could be ascribed to any of the treatments.

5. Effect on Rind Thickness

Phosphate, in the absence of other disturbing factors such as the application of large amounts of Nitrogen which inhibit the absorption of Phosphate, induces thin rind. The effect of nitrogen as shown above is indirect, although well marked, and always results in the production of thick rind.

6. Effect on Juice Content

There was no significant difference in the juice content of the pulp due to any of the treatments.

7. Effect on the Sugar Content of the Juice

Sugar content of the Juice is significantly and positively correlated with Nitrogen, Potassium and ash. It follows from this that Potassium, Nitrogen and some other constituents of the ash affect the sugar contents positively.

8. Effect on the Total Soluble Solids in the Juice

The differential treatments had no significant effects on the soluble solid content of the juice.

9. Effect on the Acid Content of the Juice

Nitrogen application in all cases caused the fruit to have a higher acid content. A high potassium content also causes a high acid content. On the other hand a high phosphorus content is associated with low acid content.

10. Effect on Wastage During Storage

The Nitrogen treatments decreased the amount of wastage in fruit. In other words low nitrogen is conducive to high wastage and vice versa. A high Calcium content of the juice causes an increase in the amounts of wastage due to mould.

From the above report it appears that there is always a correlation between different elements and hence a balanced nutrition is desirable. Although fundamentally one element is as important as the other, the two most important ions that must be present in correct proportions and considerable quantities are the nitrates and the Phosphates. Their proportions should be such that considerable quantities of both ions should be absorbed to produce a high concentration of each resulting in the following:

High Nitrogen produces high Sugar Content, heavy crop, low wastage, high potassium and high proteins.

High Phosphorus produces thin rind and low acid.

[Results of similar experiments carried out at Chak 45-G.B., Gojra and Fruit Farm, Montgomery, are more or less in conformity with those obtained in S. Africa. 4 lbs. of ammonium sulphate per tree invariably gave better results as compared with higher doses of 8 lbs. and 12 lbs. Doses smaller than 4lbs. of ammonium sulphate were not tried in this experiment. Ammonium Sulphate in combination with farm yard manure has been found to be the best fertilizer. In our experiments also we found that green manuring with guara did not show appreciable improvement over the control and it would appear that green manuring with even leguminous crops that grow during the fruiting season is not advantageous.—Ed.]

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28, Dinga Singh Buildings, Beadon Road, LAHORE.

EFFECT OF ARTIFICIAL MANURES ON CROP QUALITY.

By J. B. H. Ijdo, Biochemical Journal, XXX, 12. p. 2307.

Experiments conducted in Holland on the effect of inorganic manures on the Vitamin C (anti-scorbutic vitamin) and Carotene (growth promoting Vitamin A) contents of Spinach show a remarkable correlation between Nitrogen and Potassium and the Vitamins C and A contents.

Increase in Nitrogen resulted in an increase of Vitamin C and Carotene content, while increase in Potassium produces an increase in Carotene but a decrease in Vitamin C. The influence of Calcium, Magnesium and Phosphate was found to be negligible.

Since the quality of fruits is partly decided by their Vitamin content similar experiments with fruits and vegetables, such as tomato, are desirable.

Seedless Valencia

An interesting and striking limb sport has been discovered on an otherwise normal valencia tree by Perry, A. Winder, in his Citrus Orchard at Riverside. Competent observers consider it a true bud mutation and this particular branch bears seedless valencies. The fruit is somewhat Pear-shaped, medium sized, having a thin peel, tender pulp without a core and is very juicy. The leaves of this sport are larger and more pointed. Steps are being taken to have budded trees from this branch.

Death-Ray for Insect Control

Dr. Emery Tiffany claims to have discovered a death-ray capable of killing scales and spiders on citrus trees. This startling declaration was made by Dr. Tiffany before the Claremont Pomological Club, Pomona. The chief problem with this ray is to reduce its vibration so as not to injure human beings and animals. It is claimed that the soil bacteria may be saved by covering the earth below the tree by a special paper through which the rays do not pass.

The Machine is said to cost \$1,500 and it takes 15 minutes to treat a tree. One person can operate two machines at a time.

Frost Injury to Citrus Reduced by Growth in Date Gardens

It was observed by Dr. H. J. Webber before a Lemon Men's Club meeting that Citrus trees interplanted in Date gardens in the Coachella Valley suffered very slight injury from frost. A plausible explanation is attempted and it is believed that these trees receive less light and heat and

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consequently remain dormant. However, some other unknown factor is said to be the main cause.

ROOTSTOCK AND SCION INFLUENCE IN CITRUS, by R. W. Hodgson, S. H. Caneron and E. R. Eggers, University of California, Los Angeles, California Citrograph, January 1937.

The influence of root-stock on the growth and fruiting of Citrus has been well recognised for many years, but the influence of scion on rootstock in Citrus has received very little attention. In the present contribution Prof. Hodgson and others report their work on reciprocal effect of rough Lemon (*Citrus Limonia*) and Trifoliolate Orange (*Pncerus trifoliata*).

Rough Lemon rootstock invigorate trifoliolate scion and the trifoliolate rootstock dwarfs Rough Lemon scion. Rough Lemon scion invigorates trifoliolate rootstock and trifoliolate scion on Rough Lemon dwarfs rootstock.

The General Conclusions are (a) the rootstock may either invigorate or dwarf the scion, (b) The scion may either invigorate or dwarf the rootstock and (c) The Rootstock scion influences appear to be reciprocal in nature.

News comes from Monterey County, California, that they are killing Quail (a bird allied to partridge) by getting them drunk. The hunters soak grain in alcohol and sprinkle it on the ground. Shortly afterwards the birds are picked up intoxicated.

Bird lovers may resort to soaking grain in orange juice and spreading it where the birds are known to gather and thus give the birds new pep and vigour.

Better Fruit with Greater Yield

Prof. A. F. Kinnison of the Arizona University College of Agriculture writing in the "Arizona Produce," observes that trees maturing a heavy crop bear a better quality fruit. Here are his actual words: "On the Average, coarse, rough fruit is found on trees maturing light crop. Any orchard management practice which tends to increase production should result in an improvement in Grade and quality of the fruit. This is well illustrated with the 1936-37 Crop on the Yuma Mesa Citrus Station Plots. The crop is extremely light on trees receiving only a light application of manure. The fruit is large and rough with a thick rind, open centre, and

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low juice content. Heaviest production with fruit of far better grade and quality is on trees receiving an application of supplemental mineral nitrogen."—(California Citrograph May, 1937).

Oranges in Plenty

A tree in the camel-back district near Phoenix, Arizona owned by Fred Bliklen, produced 60 oranges in one cluster this year. This particular branch has done things in a really big way for the past four seasons. The first year of bearing it bore three dozen fruits, the second season four dozen, third season three dozen and in its fourth season it bore five dozen.

A similar case of a Washington Navel tree, a direct descendant from the original Tibbets trees, bearing 30 navel oranges in one cluster was observed by Mr. A. D. Shamel of the U. S. Department of Agriculture at Riverside. The Grove having this tree is owned by Fred. M. Reed of 3089 Chicago Ave. Riverside, California.

PREPARATION OF CITRUS WINES. By H. W. Van Loesecke, H. H. Mottern, and G. N. Pully, of the U. S. D. A., Citrus Products Station, Florida, in Industrial and Engineering Chemistry, Vol. XXVIII. pp. 1224—1229, 1936.

The authors describe the preparation of Wines, Brandies and Cordials from third grade and cull Oranges and Grape Fruit Requisite amounts of cane sugar are added to the freshly expressed juice so as to raise the sugar content to 20° to 25° Brix. The juice is then inoculated with pure culture of wine yeast and kept at 16°C. The fermentation is complete in about 10 days. The product thus obtained contains 10 to 17% alcohol and has a characteristic odour and taste; the flavour of the fruit is, however, lost. Fortified wines are obtained by adding Citrus spirits to the above product.

The Cordials are prepared from sugar syrup and Citrus spirits to which a requisite quantity of rind essential oil is added. An ideal cordial contains 33% alcohol and 37% sugar.

FRUIT INDUSTRY IN OTHER COUNTRIES

India, essentially a country of vegetarians, has been growing fruits from time immemorial. Some varieties of fruits even originated in India but we count nowhere so far as the fruit production of the world is concerned. Even the Punjab, the celebrated land of five rivers, possessing a variety of climate from the coolest to the hottest with hilly tracts, sub-montane regions, plains and deserts and consequently ideally suited, from the point of climate, to grow almost any kind of fruit grown in the world and coupled with this, the remarkable irrigation facilities and wonderfully rich soil and its husky robust peasantry, has made no great progress in the fruit industry although fruit growing was patronized even by the early Mogul Rulers. Gone are the days when fruits were considered an article of luxury. It is now an essential part of human diet especially for people doing brain work. In fact it is no exaggeration to say that the standard of civilization of any country can be easily determined by the extent of consumption of fruit in that country.

The Punjab (British) with a population of about $2\frac{1}{2}$ crore of people has only about 65,000 acres in solid block under gardens in spite of the great progress made in recent years in the fruit industry. This area is, of course, exclusive of several million date palms and mangoes, etc., growing in scattered places on the borders of fields or roads, etc. This acreage is too insignificant as compared with other countries. California, with a population hardly 25% of the Punjab, has twenty lacs of acres under fruits. Palestine with an area of only about $1\frac{1}{7}$ th of the Punjab and a population only 5% of the Punjab (equivalent to that of one district of our Province) has about 150,000 acres under fruits including over fifty thousand acres of citrus fruits. It exported in 1934 about $3\frac{1}{2}$ crore rupees worth of oranges alone to foreign countries. Italy, with an area and population of about 20% and 77% respectively more than that of the Punjab, has got 1.38 crore acres under fruits both in solid blocks and mixed farms and the garden produce constituted in 1932 about $1\frac{1}{3}$ rd of the total export (valued at Rs. 80 crore) from Italy, and produced about 100 crore gallons of wine alone, $3\frac{1}{2}$ crore maunds of olives, about the same quantity of citrus fruits and $5\frac{1}{2}$ crore maunds of other fruits. France, with an area and population of about 115% and 75% respectively more than that of the Punjab produced about 20 lac tons (about 5 crore maunds) of apples and pears alone and the area under grape vines is staggering—there being about 35 lac acres in 1933, and total production of wine alone amounted to 149 crore gallons in 1934. Egypt, with a population of about half that of the Punjab,

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which had no fruit industry worth mentioning only a few years back, has started to develop fruit industry in right earnest and its budget for the Horticultural Department now amounts to over fourteen lacs of rupees a year which is almost $\frac{3}{4}$ th of the total budget of the Punjab Agricultural Department.

All advanced countries of the world are doing every thing in their power to develop their fruit industries. The Egyptian Government, by supplying annually lakhs of plants free of cost and passing legislation to control private nurseries and to regulate planting of future gardens, subsidizing export of fruit and by strengthening their Horticultural Department to carry out experimental and advisory work on an immense scale has given great impetus to the fruit industry. The phenomenal progress of citrus industry in Palestine (an increase of 800% in eleven years) is most striking. Citrus Inspection Service to regulate the packing of citrus fruits for exporting, Citrus Ordinance to raise funds for advertising Palestine oranges in foreign countries, organisation of fruit growers, immense propaganda carried on by the Government Horticultural Department and such other methods have raised Palestine to an enviable position in the estimation of other Horticulturally advanced countries. The Italian Government by the enactment of various legislations and offering numerous facilities such as remission of land revenue to those planting gardens on certain approved lines, free supply of nursery plants, erection of cold storage plants and packing houses for fruits, reducing transportation charges, organising the fruit growers, subsidies to fruit products factories have immensely contributed to the development of fruit industry.

No one who wishes to know about the status of fruit Industries of Egypt, Palestine, Italy, and Sicily, France and Switzerland, the total fruit acreage and production, what respective Governments in these countries are doing in the form of legislation, the results of numerous experiments carried out in various experimental stations in these countries, kinds of fruits grown and varieties of each found most successful, system of fruit cultivation, wind breaks used, the names of nurseries from where plants can be obtained, the remarkable organisation of the Jews in Palestine and their Scheme of land colonization and a mine of other useful information, should fail to read the four bulletins on the fruit Industries of these countries published by the Punjab Fruit Development Board; and priced at annas 8 each or Rs. 1|12| for all four parts. These bulletins which can be had from the Editor of the Punjab Fruit Journal, Lyallpur are the result of a visit that Sardar Sahib Sardar Lal Singh, Fruit Specialist of the Punjab Government paid to these countries and the brief notes that he took during this visit.



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Vol. 2

"THE ANNUAL MEETING AND AFTER"

Annual gatherings of societies and organisations have a significance of their own. They afford a good opportunity to take stock of things and to re-organise matters for the future.

The Punjab Fruit Development Board is yet in its infancy. Its second annual meeting having been held at the Town Hall, Lahore, on 12th January, 1938. Newspapers' headlines on the day following the meeting pronounced it as a grand success. It was to a well attended representative gathering of the leading fruit growers of the province that the Hon'ble Minister for Development delivered an inspiring speech promising brighter days ahead for the provincial fruit movement. The Presidential address by the Hon'ble Ch. Sir Shahab-ud-Din was equally convincing and weighty. The Annual Report of the working of the Board by the Honorary Secretary provided another interesting reading. A glance at the major resolutions passed at the meeting and the heated discussion preceding them makes us believe that the 'heart' of the provincial fruit movement is clear and determined as before.

It is well that the leaders of the movement while entrusting the reins of office in the hands of seasoned captains like the Honourable Ch. Sir Shahab-ud-Din and the Fruit Specialist Punjab have also included a number of renowned Parliamentarians in the list of the new year's Managing Committee. With this new combination of leadership the members of the Board should confidently look for better days ahead.

A rapid reading of the Annual Report of the year in question should convince all doubting public-men and officials of the possibilities of valuable services which the Board can render for the rapid development of the provincial fruit industry. The Fruit Section of the Punjab Agricultural Department with its army of experts is doing immense good in its own way,

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but there are a number of things which public organisations like the Fruit Development Board alone can attend to.

We are fully alive to our limitations and responsibilities. The number of our shortcomings and handicaps are a legion. We also know that we have deviated a bit from our destined goal. We are also aware that the Board is not to remain simply as a sort of a Publishing House or an Information Bureau.

There is the call of the country-side fruit grower which cannot be left unattended to any longer. Progressive fruit growers are clamouring for better markets for their fruits. They are tired of dealing with illiterate defaulting garden contractors who, without proper knowledge of market requirements either dump the local markets or straight-away pack entire products off to markets like Lahore, Amritsar and others, and be at the mercy of the fruit 'arhtias.' There was a continued slump in the major citrus fruit markets of the province last season. The prices of malta oranges at one time towards the tail end of January in the Lahore market touched as low as Rs. 1-8-0 per 100 for first grade fruit.

Some intelligent growers have begun to doubt whether fruit farming will continue to remain paying. Timely check must be put to this disheartening spirit. Come what may, a model fruit market must be started this winter at Lahore under the auspices of the Board in order to bring better returns to the growers. It does not speak well for the leaders of the movement or the Government Officials who have been entrusted with the responsibility of settling the matters, that they should not be able as yet to settle the question of the site of the Fruit Market. Let us practise the oft tried commercial dictum of 'start and watch rather than wait and mark' at least in this case.

K. L. KOHLI.

Bulletins on Fruit Industries of (i) EGYPT, (ii) PALESTINE, (iii) ITALY & SICILY, (iv) FRANCE & SWITZERLAND, Available from the Punjab Fruit Development Board, Lyallpur, priced at annas eight each or Rs. 1-12-0 for a complete set of four.

That the fruit industry in India has a great future is the gospel which the author of these bulletins S. S. Lal Singh, Fruit Specialist, Punjab, has repeatedly been urging with conviction in Northern India since the very inception of the Fruit Section in the Punjab a decade ago. In furtherance

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of the same he has been able to give an all round good start for the development of the fruit industry in the Punjab.

All lovers of fruit industry, both public-men and officials alike, will find these timely publications of considerable utility, for these will enable them to compare the pigmy budding fruit industries in various provinces with those of the progressive countries of the West; and would surely open up a vista of possibilities, as to how best experiences of those leading fruit growing countries can be assimilated to the advantage of the indigenous fruit industries.

A unique feature of these bulletins is an insight into the ways and means that the Governments of these countries are adopting to develop the fruit industries of their countries.

Palestine with an area only about 1/7th of that of the Punjab has about 150,000 acres under fruits, and it exported in 1934 about 3½ crore rupees worth of oranges alone to foreign countries. In 1932 garden-produce amounting to about Rs. 27 crores accounted for one-third of the total export of Italy. France had a total production of wine amounting to 149 crore gallons in 1934. Even Egypt, with a population of about half that of the Punjab earmarked an annual budget of over fourteen lacs of rupees for the development of its horticultural department alone.

Egypt supplies to the public lacs of fruit plants free of cost and has passed special legislation for subsidy to fruit industry and laying out of new gardens. Italy did not hesitate to pass a special decree, remitting land revenue for a number of years to those adopting an approved system of fruit gardening. It offered subsidies to develop its fruit preservation industry, installed cold storage plants and packing houses, and arranged Agri-Horticultural exhibitions with facilities of almost free transportation, board and lodging to visitors. Chapters dealing with the fruit inspection service regulations and citrus advertising ordinances in Palestine are equally interesting.

For nurserymen, horticultural departments and others desirous of introducing new fruit varieties for trial, these bulletins are of special importance as the chapters dealing with varieties of fruit grown and their characteristics are written with this special object in view. The cultural aspects of horticulture would interest not only the practical fruit growers but also the research workers in various provinces.

These bulletins are based on the notes taken by the author while

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on tour in these countries from April to October 1934. The Punjab Government partly financed this tour, and this tour report has now been published with the permission of the Punjab Government by the Punjab Fruit Development Board for the benefit of the general public.

K. L. KOHLI.

GRANT OF "TACCAVI" UNDER THE LAND IMPROVEMENT LOANS ACT XIX OF 1883

The Deputy Secretary to Government Punjab, Revenue Department vide his letter No. 2493-A of 8-4-38 addressed to all Commissioners in the Punjab has intimated the intention of the Government to grant Taccavi Loans under the above-mentioned Act XIX of 1883 for horticultural purposes. The Declaration mentions that "horticultural operations" shall be deemed to be "improvements" for the purposes of this Act. However, the assistance in the form of Taccavi Loans is to be given for fruit gardens for profit and not for ornamental gardens. All Deputy Commissioners of the province have been instructed accordingly.

[Members of the Board are advised to avail of the above provision.—Ed.]

ORDINARY AND REGULAR MEMBERS CAN BECOME LIFE MEMBERS

"Ordinary" and "Regular" members of the Punjab Provincial Co-operative Fruit Development Board are hereby informed that in accordance with the recent decision of the Board at the Annual General Meeting, they can convert their "Ordinary|Regular" membership into Life membership of the Board during the course of this year, and for such conversion they will be duly given full benefit of credit of their entire previous subscriptions hitherto paid towards the Life membership.

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FRUIT CO-OPERATIVE MOVEMENT IN THE PUNJAB

—Being—

The Presidential Address of the Hon'ble Ch. Sir Shahab-ud-Din, President of the Punjab Fruit Development Board, delivered at the Annual General Meeting of the Board, held at the Town Hall, Lahore, on - - January 12, 1938. - -

Hon'ble R. B. Ch. Sir Chhotu Ram & Gentlemen,

Necessity for Developing Fruit Industry :—Since we met last some remarkable constitutional changes have been made in our country. We enjoy, as you all know, an autonomous Government and we are pleased indeed to have amidst us the Hon'ble R. B. Ch. Sir Chhotu Ram, Minister for Development. I can foresee a quick acceleration of the pace of agricultural progress, because the present Government stands for the interests of the vast agricultural population, no less than those of other Sections of the people. In the first general meeting of the Board, held at the Government House on 23rd April 1936, when H. E. the Governor graced the meeting by his presence, I greatly deplored that our country should be the most backward in the world even in fruit industry and said that it must be revolting to the self-respect of every Punjabee that we should be dependant on other countries even for fruits in spite of the fact that our Province is ideally suited for the production of most kinds of fruits grown in the world, because of the variety of climate ranging from the hottest to the coolest, wonderful irrigation facilities, fertile soil, cheap labour and hardy peasantry. Ours is largely a country of vegetarians and we have been growing fruits from time immemorial. Fruit has also come to be recognised by the leading medical authorities of the world as an essential part of human diet. I, therefore, expressed the hope that the Punjab Government would do all it can to develop its fruit industry.

The importance of the subject is my only excuse for repeating that with proper organisation and State Patronage, fruit industry can easily provide not only bread to millions in the Punjab but can considerably enhance the provincial revenues. The development of fruit industry will not only contribute to the economic prosperity of both urban and rural

population but shall considerably contribute towards the toning up of the intellectual and physical development of the people. It is no exaggeration to say that the extent of the civilisation of a nation can be very largely gauged by the amount of fruit consumption in its country. Those obsessed with defeatist mentality always look down upon any high ambition or bold development policy, but it is not utopian to conceive that in this Province, possessing about three crore acres of cultivated area, there should be, for every 100 acres, at least a couple of acres under garden and every acre, through judicious and intensive cultivation, yielding an annual income of Rs. 100 to Rs. 500. This, with a net work of hundreds of fruit preservation factories and bye-product plants, scattered all over the fruit growing centres of the Province, is bound to make the progressive fruit growers prosperous.

All this, however, is possible only if our province adopts a bold policy. The Punjab Fruit Development Board has done a great service by publishing four special bulletins dealing with the fruit industries of Egypt, Palestine, Italy and Sicily, France & Switzerland, which are based on the observations made by S. S. Lal Singh, Government Fruit Specialist, during his tour to these countries. The bulletins give a vivid idea of the tremendous progress made in other countries, special efforts made and legislations passed in the interests of their fruit industries. California with a population of only about one-fifth of the Punjab has about 20 lacs of acres under fruits (i.e., 25 acres for every 100 acres of cultivated area), Palestine with a population of only about 5% of the Punjab exported in 1934 over three crore rupees worth of oranges alone, one-third of the total export of Italy comprises of garden produce, which is worth about 27 crores of rupees, France, a country of small holdings, has no less than 35 lacs of acres under grapes alone. Even Egypt, with a population of only half of our Province devotes for its horticultural department about 14 lacs of rupees which is about two-third of the total budget of our Agricultural Department. Egypt supplies to the public lacs of fruit plants free of cost and had to pass special legislation for subsidy to the fruit industry and to regulate the production of nursery plants and laying out of new gardens. Italy did not hesitate to pass a special decree, remitting land revenue for a number of years to those adopting an approved system of fruit gardening, offered subsidies to develop its fruit preservation industry, installed cold storage plants and packing houses, holding Agri-Horticultural exhibitions with facilities of almost free transportation and board and lodging to visitors. The fruit inspection service

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regulations and citrus advertising ordinances in Palestine are also worth studying.

Gentlemen, such are the steps that the Governments of other countries are taking in developing their fruit industries. On the other hand our Government has moved rather slowly. I would strongly urge the Punjab Government to follow the lead of other countries and give impetus to this industry by all possible means.

Matters of Exceptional Importance:—In my last speech I had referred to some matters of exceptional importance that were agitating the minds of fruit growers and the chief amongst them were (a) Provision of adequate supply of water for gardens, (b) injustice of charging land revenue, malkana, abiana twice a year while the trees bear crop once a year and over and above this, depriving the fruit growers of kharaba concession in case of failure of fruit crop, (c) the hardships suffered by Kulu fruit growers in the transport of their fruit. I had also referred to the future programme of the Board, since all these items are being referred to in detail by the Honorary Secretary in his annual report, I shall only make a passing remark on the same.

Sub-Committees of the Board:—The Board has been carrying on its work through various sub-committees such as Fruit Journal Committee, Canal Sub-Committee, Fruit Market Committee and Bud Selection Committee. Besides these, a very strong deputation consisting of some prominent members of the Punjab Assembly and other important fruit growers waited on the Hon'ble Premier and other Ministers at Simla in July last and placed before them the demands of the Fruit Development Board in regard to the grant of a site for a Fruit Market at Lahore, substantial subsidy to the Board, provision for adequate supply of water for gardens, etc. Another strong deputation headed by Mr. H. R. Stewart, Director of Agriculture, Punjab, waited on the Administrator, Lahore, and another deputation of the Board waited on the Commissioner, Lahore Division, in connection with the urgent necessity of establishing a first class fruit market at Lahore. Since 29th June, 1936 when the present Managing Committee was elected, it has held six meetings. The various Standing Sub-Committees held 10 sittings.

The Fruit Journal Committee:—This Committee has been very successfully carrying out the Punjab Fruit Journal work and the publication of special bulletins. Considering that there is great dearth of horticultural

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literature dealing with Indian conditions, the Punjab Fruit Journal has filled a great void. It has been well received not only in the Punjab but in other Provinces of India, from where applications are being received for the supply of the fruit journal. It is rarely that periodicals and especially technical journals are self-supporting from the very beginning but due to the incessant efforts of S. S. Lal Singh, our Honorary Secretary, the Punjab Fruit Journal has not only been able to pay its own way but has been able to declare a net profit of about Rs. 700 for the first three issues. So the Board is fortunate in not having to incur any loss on this enterprise, although we were quite prepared for it as the journal is the very life of the Board without which this organisation could not be expected to achieve any great results.

Other Publications:—The Board has also published, as referred to previously, four bulletins dealing with the fruit industries of various countries and these should prove highly useful to all interested in the development of horticulture. Various nursery men, practical horticulturists and no less the research workers will find in these bulletins a wealth of valuable information.

The Fruit Market Committee:—This Committee held four sittings and had to face great many difficulties in its task but its efforts, thanks to the interest of our popular Premier, are shortly going to be crowned with success. A central site outside Shahalmi Gate is likely to be handed over to the Fruit Development Board very shortly to enable the Board to run a Central Fruit Market there under hygienic and sanitary conditions. With the establishment of a market, the Board hopes to organise the marketing of its members' produce on right lines not only at Lahore but in other towns as well. Other sister organisations in C. P. & U. P. have also been in correspondence with us for the sale of their fruits on reciprocal basis.

The Bud Selection Committee has come to the conclusion that the best way to lay a sound foundation of the fruit industry is to carry out a survey of important orchards in the Province, mark out trees of outstanding merit both in regard to the yield and quality of the fruit and then prepare, on a large scale, nursery plants of the best varieties for supply to members at cost price. The Board requested the Government to pay half the cost of this enterprise, the other half to be borne by the Board. I am sorry that the Director of Agriculture, Punjab, has not been able to see his way to agree to this very reasonable proposition but the Board would again request the Government to give this a favourable consideration. The Government should welcome that an organisation has sprung

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up to shoulder and share the responsibilities with the Government for the development of fruit industry.

The Canal Sub-Committee:—This Committee has approached the Government several times before for the provision of adequate supply of water for gardens but I regret to say that the response of the Government has not been encouraging and the attitude of the Canal Department has been greatly disheartening to the fruit growers and I would appeal to the Government to generously respond to the demands of the fruit growers and win over their gratitude. After all the demands of fruit growers are immensely modest as compared with what the Governments of other countries are doing for the development of their fruit industries and we expect that the popular Government of the day would rise to the occasion.

Fruit Preservation:—The Committee also attended to several other matters pertaining to fruit preservation industry which are referred to in the report of the Honorary Secretary. One of these related to the question of supply of containers for the fruit preservation industry. The Committee strongly feels that fruit preservation industry would remain greatly handicapped unless provision is made for the supply of tins and glass jars at a reasonable price to the manufacturers. I hope the Government would be pleased to give sympathetic consideration to this question.

Fruit Group in the Assembly:—S. S. Ujjal Singh, M. L. A., Parliamentary Secretary (Home Department) was prevailed upon by me to initiate and proceed with the formation of a "Fruit Group" in the Punjab Legislative Assembly, which already includes a number of important leaders of the fruit movement, with a view to push the cause of the Punjab Fruit Development Board through the legislative machinery and I am glad to say that he, along with other such stalwarts as Syed Amjad Ali, K. B. Nawab Ahmed Yar Khan Daultana, Lt. Nau Nihal Singh, S. Mohammad Hussain, Nawab Shah Nawaz Khan, S. Sampuran Singh and others have started work in right earnest and they deserve our thanks.

Membership of the Board:—The Board has a membership of 425 and represents all interests of the fruit industry of the Province. Fruit Growers' Association have also been formed at good many places and are referred to in the Honorary Secretary's report.

Hindustan-Tibet Road:—Kotgarh Fruit Growers' Association has made a very strong representation to Government for opening up the

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Hindustan-Tibet Road to controlled motor traffic to enable the zamindars to send their fruit and vegetables to cities at reasonable cost and the Punjab Fruit Development Board has strongly supported their case and has approached all members of the Punjab Legislative Assembly to lend their support to this deserving cause.

Donations from local bodies:—Our thanks are due to a number of local bodies who have contributed a sum of Rs. 720/- to the Board. This is referred to in detail in the Honorary Secretary's report.

I hope that these local bodies as well as others would give more substantial help in future to this beneficent movement for the good of the Province. The Board having covered most of its deliberative programme is now on its way to launch a number of constructive beneficial schemes.

Need for Government Help:—At present the Honorary Secretary has got only one Assistant Secretary and a clerk to run the whole show and he is finding it difficult to cope with the immense amount of work connected with the **Fruit Journal**, correspondence with members and Government as well as the work connected with various Sub-Committees. The proposed fruit marketing scheme will need special staff and the proposed bud selection programme would also require the services of properly qualified men. The establishment of the fruit market, conversion of the quarterly fruit journal to a monthly one, giving effect to the decision of the Managing Committee to issue price bulletins to show prices of fruits prevailing in various markets of India and such other constructive programmes require considerable expenditure and it is futile to expect that expenses can be met by the paltry subscription of members. The U. P. Fruit Development Board has been enjoying a subsidy of Rs. 4,000 per year from its very inception and from last year it has been raised to over Rs. 6,000 a year. I regret to say that the Punjab Government has not yet responded to the appeals of the Board for a substantial subsidy of Rs. 5,000 to Rs. 10,000 per year until the Board gets on its proper footing.

Appreciation:—I shall be failing in my duty if on behalf of the Board I do not express a very high appreciation for the hard work done by the members of the Managing Committee and various Sub-Committees, who attended these meetings at great personal inconvenience and at considerable expenditure of time and money in coming over here from distant places. This has been all a labour of love.

In this connection it is my pleasant duty to make a special reference to Sardar Sahib Sardar Lal Singh, Fruit Specialist, Punjab and Honorary

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Secretary of our Board. All that has been done up till now is entirely due to his gigantic efforts and unfatiguable energy. For advancing and developing the fruit industry in the Punjab he has been working at the sacrifice of his health, like a horse, nay like an engine and I consider it my proud privilege to thank him on behalf of the Board. His Excellency the Governor was pleased to remark in his inaugural address at the last meeting of the Board that the Punjab is fortunate in having an enthusiast like S. Lal Singh as the Head of the Fruit Section since it was started 10 years ago. The Sardar Sahib fully deserved the tribute paid to him by His Excellency and I am sure all of you will agree with me that the work he has since done deserves more appreciation and praise than before.

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THE PUNJAB MINISTRY DETERMINED TO
DEVELOP FRUIT INDUSTRY

—Being—

The Annual Address by the Hon'ble R. B. Ch. Sir CHHOTU RAM, Minister for Development, Punjab, delivered at the Annual General Meeting of the Board, held at the Town Hall, Lahore, on January 12, 1938.

It is a matter for deep regret that the Honourable the Premier who had kindly consented to deliver the annual address was suddenly taken ill and has consequently been prevented from giving us the pleasure and benefit of his views. As Minister of Development I am associated with the Fruit Development Board as its Vice-Patron, and, thus, in the absence of the Premier, to-day's conference is reduced entirely to a family affair. However, with the short time at our disposal, we could not have invited anybody from outside, and there is nothing left to us but to make the best of a bad bargain.

The industry of fruit culture under regular scientific guidance is of comparatively recent origin in the Punjab. It was only in 1926 that the first Fruit Specialist, your present energetic Honorary Secretary, was appointed. It is true that experiments in fruit culture had been in progress even prior to 1926. Mr. Mitchel's farm near Okara and Doctor Cheema's farm near Montgomery—both situated on land granted by Government for experiments in fruit culture—had already been in existence for some time previous to 1926. But it is equally true that systematic scientific guidance for the cultivation of fruit trees and the promotion of fruit industry in general in the province as a whole had been made available in 1926 for the first time.

Since 1926 very satisfactory progress has been made in a number of directions. Extensive research has been carried out, and the teaching which has been given and the propaganda which has been done have resulted in such a wave of enthusiasm for fruit growing that, in order to cope with the demand for instruction and for help as well as to provide information,

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fruit research stations have been opened at various centres and special staff has had to be engaged. The area under fruit in the province has greatly increased. Instruction to suit all requirements is now available either in short courses of a fortnight's duration each both in fruit culture and in fruit preservation, or in extensive courses covering twelve months in fruit culture and seven months in fruit preservation.

The past year alone has seen considerable progress in the interest of fruit industry. During this year the following notable additions have been made to the already extensive facilities which the Department of Agriculture offers to those interested in the fruit industry:—

(1) Government has erected and equipped a canning hall at Lyallpur where experiments on fruit preservation can be carried out on a semi-commercial scale and where instruction can be given to those who desire to take up fruit preservation as a business.

(2) A small experimental cold storage plant has been erected at Lyallpur where fundamental data can be collected on all matters connected with such storage. Everybody will easily realise that if the selling season of various fruits can be extended through cold storage the glut which at present occurs in the height of the season can be avoided and considerable profit will result both to growers and traders. This experimental plant will test the potentialities of cold storage and will provide the necessary data for enterprising individuals or commercial concerns desirous of taking up cold storage of fruit.

(3) A scheme of research on citrus stock has been initiated for five years in the first instance. For this purpose an experimental orchard of 25 acres has been laid out at Montgomery with root stock material collected from all the principal citrus growing tracts and classified and worked up at Lyallpur during the last three or four years. The object of this work is to ascertain the most suitable stocks on which to bud the various kinds of citrus fruits. Similar work on cold region fruits in Great Britain has, I understand, revolutionised the fruit nursery business in that country.

(4) A progeny garden of 25 acres at Risalewala Farm (Lyallpur) has been laid out for the production, on a large scale, of bud-wood of various good varieties of citrus fruits. The produce of this garden will solve the practical difficulty with which nursery owners now find themselves faced in even purchasing an adequate supply of good bud-wood for the production of fruit nursery plants of reliable origin.

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(5) Government has sanctioned the establishment of a 25 acres garden at Attari Farm during the current financial year. This experimental area will be devoted to the collection of all kinds of important data on many aspects of fruit growing, such as, irrigation, manuring, pruning, etc.

(6) An experimental fruit farm of 25 acres has just been put down at Palampur under a large variety of fruit trees which have been imported in many cases from California and other foreign countries. The object of this farm is to ascertain what kinds of fruit can be produced successfully in the Kangra Valley with a view to concentrate on fruit production in that tract.

(7) The San Jose Scale pest has been responsible for enormous damage to the fruit industry. A scheme financed out of the funds placed at our disposal by the Imperial Council of Agricultural Research has been started for a survey of the province in connection with the extent of the presence of this pest.

(8) An advanced course of seven months' duration in fruit preservation was started in April last to suit the need of those who propose to take up fruit preservation as a business.

Thus it will be seen that the progress up to date has been quite encouraging. But neither your Board nor Government is prepared to rest content with what has been achieved so far. The Fruit Development Board was formed only in 1935. During the short period following its formation the Board has made its existence felt all round. The masterful personality of your President has done a great deal to push forward the cause which your Board has undertaken to serve. His vigour, like his knowledge and experience of fruit culture, seems to grow with his age and I need hardly say what a lesson in zeal and earnestness his activities as a private fruit grower and as President of your Board have to teach to the younger generation. Your Secretary, Sardar Sahib Sardar Lal Singh, is both energetic and capable and has made full use of his energy and capacity to promote the interests of the Fruit Development Board no less than fruit industry in general.

The Board has already done a vast amount of useful work in which it deserves to be congratulated. I also congratulate the Board very warmly on its venture of having started a quarterly Fruit Journal. Nobody who knows the value of propaganda will be inclined to under-rate the need and importance of such a journal.

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The Board has also pressed on the attention of Government some of its urgent needs. These include the provision of additional irrigation facilities for fruit gardens, the remission of land revenue until trees begin to bear fruit, the extension of the benefit of kharaba rules to fruit gardens, a site for the location of a fruit market in Lahore, and annual financial assistance until the Board has had time to improve its own financial resources. Only the last two items fall under my portfolio and I can assure you that they will receive very careful and sympathetic consideration at my hands. The other items relate to the Department of Revenue and are, I understand, under the active consideration of that Department.

My own department has, in its turn, some other proposals in view. When these proposals are translated into actualities they will give a little added impetus to the fruit industry. There is a demand for advanced training in horticulture and horticultural research which is one of the subjects for the M.Sc. (Agri.) degree of the University of the Punjab. In order to provide the necessary facilities for this purpose Government has accorded administrative approval to the appointment of an Assistant Professor of Horticulture, a Demonstrator and a Laboratory Attendant.

Improved Basra dates which were imported into the country can be a source of great income in the south-west of the province. If date growing were encouraged on scientific lines in certain suitable areas of the Punjab it would add substantially to the income of the people provided that proper marketing facilities for the disposal of the crop are arranged. The quantity of date suckers produced at present is entirely inadequate for local needs and the first essential is greatly to extend the area planted under these improved dates. Accordingly, a proposal to start a Date Farm of 50 acres is under consideration.

The scheme for providing a large number of reliable fruit nursery plants for sale to the public at cheap rates has been financed during the last two years from the Government of India grant for rural development. As from next year Government has approved administratively its being financed as a permanent service from the provincial revenues. The effect of increasing the scope of the Department's fruit nursery activities will be fully felt during the coming year when it is expected that at least fifty thousand fruit nursery plants will be available for sale to the public at cheap rates from these nurseries. In the following year it is hoped that these figures will be exceeded.

Lastly, I assure you that all reasonable help, both financial and

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technical, will be rendered to the Board readily by the Department of Agriculture while for the province in general I am determined to see as large an extension of fruit growing as circumstances permit. Subsidiary sources of income to the average agriculturist are essential if he is to be rescued from his present plight of economic helplessness. Fruit growing promises to furnish one of these sources over a very large portion of our province, and I am determined to exploit it to the fullest extent possible for the benefit of the small agriculturist. I have no doubt that the Fruit Development Board can be of great help, both direct and indirect, in this direction. This potential usefulness of the Board to the smaller man gives me an additional interest in its growth and prosperity. Accordingly, the Board can always count on my personal interest and goodwill in its desire and intentions to grow to its full height.

[The Hon'ble Ch. Sir Shahab-ud-Din, President of the Board on behalf of a large number of fruit growers present in the meeting expressed deep feelings of gratitude to the Hon'ble Minister for Development for having delivered the very interesting and inspiring address. This address has, undoubtedly, opened up a new vision of hope.—Ed.]

BELIEVE IT OR NOT

1. PALESTINE with an area only about 1/7th of the Punjab and a population only 5% of the Punjab has about 150,000 acres under fruits.
(ii) It exported in 1934 about 3½ crore rupees worth of oranges alone to foreign countries.

2. ITALY, with an area and population of about 20% and 77% respectively more than that of the Punjab, has got 1.38 crore acres under fruits and mixed farms, and the garden produce constituted about Rs. 26 crore alone in 1932.

3. FRANCE with an area and population about 115% and 75% respectively more than that of the Punjab, had total production of wine amounting to 149 crore gallons in 1934.

4. EGYPT with a population of about half that of the Punjab earmarked an annual budget of over fourteen lacs of rupees for the development of its Horticultural Department.

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ANNUAL REPORT

OF THE

Hony. Secretary Punjab Provincial Co-operative
Fruit Development Board Limited.

For the year ending December 1937.

—: o :—

The text of the Annual Report read by S. S. Lal Singh, Hony. Secretary The Punjab Fruit Development Board at the Annual General Meeting of the Board held on 12th January 1938 at the Town Hall, Lahore.

Mr. President and Gentlemen,

The first general meeting of the Board was held on 23rd April, 1936 at the Government House, Lahore, which was addressed by His Excellency, the Governor. After conducting a part of the business, the meeting had to be adjourned to 29th June, 1936 when the present Managing Committee was elected. We are fortunate to-day in having amongst us the Hon'ble K. B. Nawab Major Sir Sikandar Hayat Khan, K. B. E., our popular Premier and Hon'ble R.B. Ch. Sir Chhotu Ram, our Vice Patron. Since a brief *resume* of the activities of the Board upto 29th June, 1936 has already appeared in the first issue of the Punjab Fruit Journal, I need not refer to the same and I shall, therefore, confine myself to the work done after 29th June, 1936.

Membership :—The total membership on 1st January 1938, stands at 425 which District-wise is as follows :—

1. Ludhiana 47, 2. Multan 43, 3. Lahore 41, 4. Karnal 40,
5. Amritsar 26, 6. Sheikhupura 26, 7. Montgomery 26,
8. Ambala 22, 9. Lyallpur 21, 10. Jullundur 21, 11. Ferozepore 18,
12. Kangra 13, 13. Mianwali 12, 14. Gujranwala 12,
15. Jhelum 12, 16. Rawalpindi 10, 17. Gurdaspur 9, 18. Hoshiarpur 9, 19. Jhang 9, 20. Dehra Ghazi Khan 5, 21. Sargodha 4, 22. Simla 2, 23. Attak 2, 24. Sialkot 1.

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We have been receiving applications for membership from Punjab States as well as Delhi Province, but we have been advised by the Co-operative Department that we cannot admit members except from the British Punjab. Needless for me to say that the above figures bear eloquent testimony to the fact that the Board is a representative body of the Punjab Fruit Growers and is entitled to speak on behalf of and for the Punjab Fruit Industry.

Local Fruit Growers Associations :—In addition to the Fruit Growers Associations of Nurpur-Pathankot, Sheikhupura, Muzaffargarh, Montgomery, Lyallpur, Amritsar, Ludhiana, Ferozepur, Karnal and Pind Dadan Khan established before the 29th June 1936, new Fruit Growers Associations have been formed at Ambala, Hoshiarpur, Garhshankar, Gujrat, Jhang, Kangra, Murree, and Kotgarh. Some of these associations have been displaying a considerable amount of activities and it is hoped that when the work of the Fruit Development Board gets in full swing, all these Associations will become active. Associations of Karnal, Hoshiarpur and Sheikhupura have been successfully holding District Fruit Shows both in summer and winter. The Lyallpur Fruit Growers Association has started its own nursery for the supply of plants to members, and has been fortunate in getting a handsome contribution of Rs. 1,000 from the 'Qila Gift Fund' for conducting its development programmes. Garhshankar Tahsil Fruit Growers Association has also been doing active propaganda amongst its members, Kotgarh Fruit Growers Association has been making strong representations to Government on the desirability of opening Hindustan-Tibet road for controlled motor traffic to enable them to transport their fruit to Simla and the plains at a reasonable cost. It also actively participated in the Hill Fruit Show held at Simla. The Associations of Lyallpur, Muzaffargarh and Pathankot have been exhibiting the fruits of their members at various fruit shows held in different places. Muzaffargarh as well as Nurpur-Pathankot Associations have arranged to get the gardens of their members sprayed against insect pests and disease. The last association has also been successful in getting various benefits from the government for the betterment of fruit industry in its locality. The Punjab Fruit Development Board expects to have, in due course, a net work of these associations which should prove instrumental in spreading the gospel of better gardening, linking together all the fruit growers into one strong body and adopt effective measures to take up urgent matters like improved marketing, supply of requisites for gardens at

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reasonable prices, control of insect pests and diseases, and to protect the interests of fruit industry in every other way.

Activities of the Board since 29th June, 1936 :—A span of a year or two is too little to judge the results of a Movement like ours which aims at building a national fruit industry in the land of 'Five Rivers' on scientific, economic and progressive lines. We expect our enthusiastic patrons to bear in mind that in case of all big movements it always takes time to settle preliminaries. When preliminaries are agreed upon, further time is needed to deliberate upon the various working details. The Managing Committee has held six meetings. The various standing committees and sub-committees held 10 sittings. With your permission I will discuss rather briefly the work of these committees.

Fruit Journal Standing Committee :—This Committee constituted by the Managing Committee on 18th October 1936 to conduct the Punjab Fruit Journal and to control other publication work of the Board, consisted of S. S. Lal Singh, Honorary Secretary, Dr. A. Waheed, Director Eastern Times and Joint-Secretary of the Board, Prof. Mushtaq Ahmad, P. V. S., S. Satwant Singh, Mr. J. W. Fairlie and Mr. K. L. Kohli, Asstt. Secretary besides three other local publicists of Lahore who, however, could not spare any time for our work excepting S. Mangal Singh, M.A., of 'The Khalsa Review' who helped us in the work of the Journal. Dr. Waheed, our Joint-Secretary took very keen interest, in the work. This Committee has been successfully issuing the Punjab Fruit Journal, the official by-lingual organ of the Board.

There is a great dearth of suitable popular literature on fruit gardening in our country and the Punjab Fruit Journal is, perhaps, the first of its kind not only in the Punjab but in India. It is attracting a large number of subscribers from outside the Punjab. It has been our constant endeavour to make this national organ of the fruit industry of the Province an interesting and useful reading both for masses and classes. The principal features of the journal have been :—

1. **The chronical of the fruit world** comprising of latest news items of interest from India and abroad.
2. **District Awakening** and news items of Provincial interest.

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3. Seasonal Hints on gardening.
4. Articles on fruit culture, fruit marketing, fruit preservation, control of insect pests and diseases.
5. Horticultural extracts from current foreign periodicals which are not easily available to an average reader in this country. Hitherto the English Section of the 4 issues has contained over 200 pages of reading material relating to 64 items and the Urdu Section contained 113 pages dealing with 40 different items pertaining practically to every phase of fruit industry.

If the journal has been a great success from technical point of view, it has been equally successful financially. It is very seldom that a technical journal, especially in the very first year, should be self-supporting but I am glad to mention that the first 3 issues of the fruit journal have shown a clear profit of about Rs. 700. The 4th and 5th combined issue is also expected to be equally profitable and may give a clear profit of about Rs. 300, so that the journal during its very first year, would be showing a profit of about Rs. 1,000. This is largely due to the efforts of my colleagues who have unhesitatingly offered their honorary services. It has been a labour of love for us all. I shall be failing in my duty if I did not express my appreciation for the hard work put in by my colleagues, especially. Dr. Waheed of the Eastern Times, Dr. Sham Singh, S. Bal Singh, S. Jalmeja Singh, Mr. P. Maya Das and S. Basant Singh who contributed articles and helped the journal in every way. Mr. Kohli, Assistant Secretary, has proved an excellent salesman. Dr. Waheed is relinquishing his duties of the Joint Secretaryship of the Board to join as a member of the Political Section of the League of Nations at Geneva and I on behalf of the Board wish him all success in his new career.

Other Publications of the Board :—Encouraged by the results of the Punjab Fruit Journal, the Board also undertook to publish 4 special bulletins dealing with fruit industries of Egypt, Palestine, Italy and Sicily, France and Switzerland which are based on the observations made by the Fruit Specialist, Punjab, during his tour to these countries. The Board has rendered a great service by publishing these bulletins which contain a variety of information

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relating to the methods of cultivation in these countries, kinds of fruits grown, special legislations passed in the interests of fruit industry and a wealth of such other useful information that will prove highly useful to all concerned in the development of horticulture. We are confident that the Board will not have to incur any financial loss due to the publication of these special bulletins which are bound to be welcomed by the well-wishers of the fruit industry throughout the country.

The Canal Sub-Committee:—Past experience has amply shown that individual representations made by leading fruit growers or by local Fruit Growers Associations are of no avail. On the other hand it was becoming evident that it would not be possible to extend any further commercial fruit gardening in the Canal Colonies, unless some immediate satisfactory arrangements with the Canal authorities were arrived at for providing extra supplies of water. The extension programmes of almost all orchards were thus at a standstill.

Although the question of the desirability of enhanced water supply for orchards had been agitating the minds of fruit growers for a considerable time, its importance was brought out in full prominence at the General Meeting of the Board held last year, when a special Canal Sub-Committee was constituted to pursue the matter further. The authorities of the Board were given to understand that the Local Government intended to take up the question in the very near future. An official meeting consisting of the Secretaries of the Irrigation Department, and other high officials was held at Simla in September 1936, and its findings were made available to the Fruit Specialist, Punjab, only at the end of February 1937 and those were brought to the notice of the Managing Committee in its meeting of March 1937. The Managing Committee of the Board considered the findings of the official meeting of September 1936, as quite unsatisfactory and decided to pursue the matter further. The first preliminary meeting of the Canal Sub-Committee of the Board was held on 26th May 1937. With a view to ensure personal exchange of views with the Irrigation authorities an informal meeting of the Canal Sub-Committee was held at Simla on 16th June 1937. I fully availed myself of the opportunity to convey the view-point of the fruit growers of the province to the Canal authorities.

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While the proceedings of this meeting are not yet made public, it appears that our efforts did not go altogether in vain. We were informed that water was sanctioned for almost all those who applied before 15th September 1936, and the cases of those who applied after that date will be dealt with after receiving reports from the Superintending Engineers of their respective circles. These orders have not, however, been yet given effect to for reasons unknown.

So the problem is far from being solved as yet. The Managing Committee in its meeting held on January 10, 1938 has recorded its protest as under :—

- (a) "That the Committee notes with feelings of disappointment the attitude of indifference adopted by the Punjab Irrigation Department in dealing with applications for grant of extra supply of water for fruit gardening :
- (b) Cases have been brought to its notice in which even the courtesy of a reply to correspondence of even prominent members of the Board has been denied by the Irrigation Department. The situation is most embarrassing for fruit growers. With a view to avoid any further complications the Committee has appointed a special Sub-Committee to wait upon the Hon'ble Minister for Revenue, Punjab.

The Committee further appeals to the members of the Punjab Legislative Assembly to look into the matter and support this laudable cause".

Gentlemen, whatever little has so far been done, is mostly due to Mr. H. R. Stewart, our Director of Agriculture, who has all along earnestly endeavoured to represent the feelings of the fruit growing community in the right circles and in the right manner. The Board feels highly indebted to him. I also owe my gratitude to S. S. Hukam Singh of Jietee gardens who is giving us the benefit of his ripe judicial experience to tackle this and other allied problems.

The Kharaba Question and other Allied Matters :—The question of extension of Kharaba concession to gardens on similar lines as for ordinary

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crops was duly represented to the Chief Engineer Irrigation, Punjab, who in acknowledgment of the same, vide his letter No. 3688-Revenue of 16th March 1937 intimated that rules regarding "Kharaba remission as published in the Irrigation Branch Notification No. 7793-Revenue of 14th October 1936 "apply to the case of orchards as for other crops".

But in actual practice the Divisional Officers of the Irrigation Department are not abiding by the above definite ruling. They still allege that remission of water rate on garden area for which an extra supply of water has been sanctioned, is not permissible, in terms of the Chief Engineer's letter No. 14109 Revenue dated 28th November 1935. Accordingly further representation on the subject was made in the matter in June 1937, and the decision of the Chief Engineer Irrigation in the matter is awaited.

The question of charging MALIANA, ABIANA and MALIKANA on fruit garden area, once a year only, were also placed before the Financial Commissioner Development Punjab, and the Director of Agriculture Punjab in the Canal Sub-Committee meeting of 26th May 1937, but nothing substantial has yet come out of these representations.

The Fruit Marketing Committee.—The services rendered at present by the middlemen to the fruit industry are notoriously expensive, unsatisfactory and out of date. How to improve upon things and to conduct the Punjab Fruit trade on modern lines under hygienic and sanitary conditions, are some of the questions which have been agitating the minds of the members of the Punjab Fruit Development Board.

To settle the preliminaries of the fruit marketing scheme a special Marketing Sub-Committee was constituted to discuss the initial stages of the scheme. The said Sub-Committee met twice and recommended the appointment of the Assistant Secretary to organise the market.

This committee made out its plan of work, and in its second sitting on the 23rd November 1936 called the leading *Arthias* for interview with a view to appoint one of them as a *financing Arthi*.

At this stage the unexpected happened, because the N. W. Ry. authorities showed their inability to stand by the previous arrangements of leasing the agreed

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market site at the Lahore Railway Station to the Board, and as an alternative they subsequently offered a number of sites at Badami Bagh and other places. But these provisional offers were also subsequently withdrawn by the N. W. Ry. authorities.

The Executive of the Board was greatly upset at these adverse decisions and consequently it had to alter its plans to acquire a suitable site for the intended fruit market in the heart of the Metropolis, preferably the Nazul land comprising of a portion of the 'Old Fruit Market Site' outside Shalimi Gate Lahore. S. B. Hari Singh and Dr. Mushtaq Ahmad, and the Hony. Secretary were entrusted to wait in a deputation on the Deputy Commissioner and the Commissioner, Lahore Division to bring home to them the dire necessity of such a market. Previously a strong representative deputation of the Board under the leadership of the Director of Agriculture Punjab had also waited upon the Administrator, Lahore to secure municipal cooperation in this much needed marketing work.

Since then the Hon'ble the Premier, Punjab Government, promised the deputation of the Board to issue orders for the lease of the site in question at a nominal rent. At the instance of the Local Government recently the Director of Agriculture Punjab invited proposals from the Board regarding (a) rent to be paid for the proposed fruit market site outside Shahlami Gate, Lahore, (b) financing of the proposed market, (c) design of the proposed market, its management etc. Different aspects of the proposal were discussed at an emergent meeting of the Fruit Marketing Standing Committee and the unanimous decisions arrived at have been communicated to the Director of Agriculture, Punjab. If the proposals are agreed upon, the construction work of the proposed fruit market would be soon taken up.

In this connection I thankfully acknowledge the services rendered by various members of the Fruit Marketing Standing Committee like Capt. Mitchell, L. Mehar Chand Mahajan, S. S. Hukam Singh, Prof. Mushtaq Ahmad, L. Dani Chand, Bar-at-Law, Asstt. Registrar Co-operative Societies, S. Kartar Singh, Marketing Officer Punjab, S. Pritam Singh, Asstt. Marketing Officer, and last but not the least S. B. Hari Singh, who in recent negotiations on the subject with the Local Government has played a very prominent role in championing our cause in the proper quarters.

Measures for protection and development of fruit preservation industry in the Punjab.—The Executive of the Board during its tenure of office has also not overlooked to attend to the problems of the Fruit Preservation Industry, which is rapidly developing in all parts of the province and has a great future. From time to time the following important questions were attended to :—

- (a) **National Mark System.**—One of the Sub-Committees of the Board in co-operation with the Northern India Chamber of Commerce has thrashed out proposals for the introduction of 'National Mark' system to ensure the production of fruit products under hygienic and sanitary conditions and to regulate the fruit preserving and canning industry on right lines. The Director of Agriculture, Punjab, has been submitted detailed recommendations in the matter and the proposals are now under the considerations of the Government of India.
- (b) **Representation to the N. W. Ry. authorities to continue existing schedule of freights on fruit juices and syrups.**—In July 1936, the N. W. Ry. authorities contemplated increase in schedule of freights on indigenous fruit syrups and juices. As a result of representation on the subject, the Agent N. W. Ry. was pleased to drop the contemplated proposal which was through and through detrimental to the interests of the fruit preservation industry of the province.
- (c) **Representation to the Administrator, Lahore.**—A representation on similar lines has also recently been made to the Administrator Lahore who it is stated, is proposing to increase terminal tax on fruit juices and syrups within the Lahore Municipal limits.
- (d) **The question of supply of containers for fruit preservation industry.**—This question was discussed in a meeting of the Managing Body held on 30th October 1937. The Committee strongly expressed that the fruit preservation industry would remain greatly handicapped, unless some provision was made for

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the supply of tin and glass jars at reasonable price. The Committee has decided to approach the Government to grant subsidy to encourage this industry.

Bud Selection Committee. —The Bud Selection Committee had its first sitting on 12th April 1937 at Lahore, wherein it formulated a comprehensive programme for launching a vigorous campaign for pushing the Bud selection work through out the province. The Committee decided to get the important orchards of the Province visited by its Sub-Committee with a view to locate and mark out trees of outstanding merit and eventually arrange to multiply in thousands, plants from such selected outstanding trees. The members of the Committee were unanimously of the opinion that the programme in view was of the highest importance, and was likely to do more than any other single item to raise the general standard both of quality and quantity of the provincial fruit production. The scheme devised by the Committee envisages the appointment of Special Bud Selection Supervisor and other staff, and it was estimated that the total cost of expenditure in the first three years would be about Rs. 5,000 per year. The whole scheme was worked out and sent to the Government with the proposal that half of the expenses of this scheme may be borne by the Government and the other half by the Board.

The Punjab Government did not agree to take any separate action to provide funds for this beneficent scheme, and it expects us to meet the commitments of this useful programme out of the meagre grant expected after April 1938.

The Managing Committee in its meeting of January 10th 1938 has decided once again to approach the Punjab Government to reconsider the matter as the work is of the highest importance for the development of the provincial fruit industry.

10.—“Fruit Group” in the Punjab Assembly:—S. S. Ujjal Singh, M.L.A., Parliamentary Secretary (Home) has been prevailed upon by the President of the Board to initiate and proceed with the formation of “Fruit Group” in the Punjab Legislative Assembly which already includes a number of important leaders of the fruit movement like K. B. Mian Ahmad Yar Khan Daultana, Mr. Amjad Ali, Mian Shah Nawaz Khan Nawab of Mandot, Lt. Nau Nihal

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Singh, S. Sampuran Singh, Mian Nur Ullah, Sirdar Mohammad Hussain and others. This has been done with a view to push the cause of the Punjab Fruit Development Board through legislative machinery. It may confidently be expected that the "Fruit Group" in the Punjab Legislative Assembly would join hands and be of considerable assistance in championing the cause of the Fruit Industry in the Punjab.

11.—The Punjab Fruit Development Board's Deputation :—Taking advantage of discussions in the Punjab Assembly, the Fruit Development Board quickly organised a deputation on the 21st July 1937 at Simla which waited on the Hon'ble the Premier and other Ministers of the Punjab Government.

The deputation represented that in view of the weak financial position of the Fruit Development Board at present the Local Government may be pleased :—

- (a) To lease out free or at a nominal rent the "Old Fruit Market Site" outside Shahalami Gate, Lahore to the Board for organising a central Fruit Market.
- (b) That the Punjab Fruit Development Board being the representative provincial body of the fruit-growers of the Punjab, be raised to a statutory body on the lines of the Indian Tea Cess Committee.
- (c) To ensure the successful working of the Board and in meeting its recurring commitments, the Board may be granted an annual subsidy of Rs. 5,000 to Rs. 10,000 until the Board's finances are placed on sound footing.
- (d) With a view to provide a permanent source of income for the Board to support its multifarious programmes, suitable legislation be enacted on either of the two lines suggested below, and the income, thus accruing, be allotted to the Board :—
 - (i) To levy a Cess of /-4- per acre of area under fruits grown in the Province.

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(ii) To levy additional Octroi duty or Terminal Tax on fruits consumed in the Punjab.

(e) To make arrangements for adequate supply of water for gardens and redress of other allied grievances in the matter.

The Hon'ble the Premier and his other Ministers gave a very patient hearing to the deputation and promised to take action on various issues at an early date.

Donations from Local Bodies.

The following local bodies have contributed the amounts noted against them as general donations towards the Punjab Fruit Development Board :—

District Board, Lahore, Rs. 100, annually; Sialkot Municipality, Rs. 50; District Board, Montgomery, Rs. 250; District Board, Multan, Rs. 50; Amritsar Municipality, Rs. 50, annually; Municipal Committee, Mian Channu, Rs. 25; Municipal Committee, Khanewal, Rs. 25; District Board, Jhang, Rs. 20; Municipal Committee, Thanesar, District Karnal, Rs. 20; District Board, Ferozepore, Rs. 25, annually; Municipal Committee, Fazilka, Rs. 20; Town Committee, Kahar Pakka, District Multan, Rs. 10; Town Committee, Gidarbaha, Rs. 10, District Board, Hoshiarpur, Rs. 40; Municipal Committee, Shujabad, Rs 10; Town Committee, Guru Har Sahai, Rs. 15; Total Rs. 720.

Before I close I wish to record my heartiest thanks to all the prominent gentlemen and District Officials in the Punjab and more particularly to K. B. Sh. Nur Mohammad, Deputy Commissioner, Sheikhupura, Mr. MacDonald, Deputy Commissioner, Amritsar, Mr. Stanton, Deputy Commissioner, Lyallpur, K. B. Ahmad Hussan, Deputy Commissioner, Mianwali, who have extended their fullest co-operation in making my task easier and in co-operating with the activities of our Board. Words fail me to express my deep sense of gratitude to the Hon'ble Sir Shahab-ud-Din and the Hon'ble Mr. Justice Bakhshi Tek Chand whose sincere co-operation and sage guidance have been of immense help to me in coping with the activities of the Board. I am also indebted to all members of the Managing Committee and other Sub-Committees for the interest they have evinced in the work of the Board.

LAL SINGH,
Hon. Secretary.

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Accounts of the Punjab P. C. Fruit Development Board.

The Accounts of the Punjab Fruit Development Board were audited by the Inspector Co-operative Societies Lyallpur on 25th August 1937. Receipt and expenditure statement based on the audited Balance Sheet is presented as under. The accounts relate to the period from the beginning of the Board till the end of July 1937.

RECEIPTS.

	Rs.	a. p.
Subscriptions	... 6,245	3 0
Donations	... 10	0 0
*Local Bodies Contributions	... 485	0 0
Advertisement Advances for Bulletins	... 29	0 0
Fruit Journal Receipts	... 564	8 6
Interest on Bank Deposits	... 103	12 0
Postage Recoveries	... 40	6 6
Establishment Payable	... 84	10 9
	7,562	8 9

Expenditure.

Establishment paid	... 900	0 0
Establishment payable	... 84	10 9
Postage	... 279	10 3
Stationery	... 98	10 6
Miscellaneous expenses prior to 8th June 1936	... 77	3 0
T. A.	... 124	2 6
General Printing	... 62	14 0
Publicity	... 18	8 0
Tonga Charges	... 3	12 0
Sundries	... 5	9 0
Petty Equipments	... 5	14 0
Bank Charges.	... 9	12 6
	1,670	10 6
Expenses of Fruit Journal	... 351	6 6
Purchase of Typewriter	... 194	0 0
Grand Total	... 2,216	1 0

Leaving balance of Rs. 5,346-7-9 details of which are as under :—

Deposits in the Punjab Provincial Co-operative Bank.

	Rs.	a. p.
Saving Account	... 4,444	9 3
Current Account	... 504	12 0
Deposit with Central Co-operative Bank Lyallpur	... 222	0 3
Imprest with Hon. Secretary	... 114	13 0
Advance with Assistant Secretary	... 3	5 3
Bill Recoverable from advertisers	... 57	0 0

*NOTE.—These donations are upto 31st December 1937 only Rs. 720.

(Sd.) K. L. KOHLI, M.A., L.S.G.D.,

Assistant Secretary,

Punjab P. C. Fruit Development Board.

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A. B. C. OF IMPORTANT HORTICULTURAL OPERATIONS

—By—

S. S. L A L S I N G H,
Fruit Specialist, P u n j a b .

[The Fruit Section of the Punjab Agricultural Department had established a model miniature garden of 5 acres at the premises of the last All-India Exhibition, Lahore, showing different systems of planting gardens, layout of roads, sandils (avenues), and water channels, etc., and planting of trees as wind-breaks around the garden for protection against wind-storms.

Besides the garden referred to above, the adjacent plot of land was devoted to the demonstration of various garden operations. A printed guide on the subject was distributed to the visitors and the same is reproduced here with slight modifications.]

DIFFERENT METHODS OF PROPAGATING NURSERY PLANTS

1. Propagation by Cuttings

Cuttings for propagation are taken from mature wood from healthy plants before spring growth starts. They should be cylindrical, 9" to 12" in length, with 3 to 4 plump and prominent buds. The top is cut slanting $\frac{1}{2}$ " above the bud and the lower end cut straight and immediately below the bud. They should be planted deep and slanting in rows leaving only one or two buds above the ground. Planting distance is 9 to 12 inches from one another and 1 ft. to $1\frac{1}{2}$ ft. between rows. Cuttings should preferably be calloused before planting, i.e., burrying the cuttings in sand which is kept slightly moist. Grapes, fig, pomegranate, sweet-lime and sometimes mulberry and plum also are propagated by this method.

2. Propagation by Suckers

Suckers are off-shoots of the parent plant arising just below the ground. They should be carefully removed with as many roots as possible. Date palm, pear and banana are propagated by this method. Suckers arising from pear trees are also used as stocks for budding.

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3. Propagation by Layering

A vigorous branch near the ground is ringed or incised and pegged at this point in the ground and sometimes in the earthen pot, and when it strikes root, it is severed from the parent plant and removed with its roots. This method is generally used in the case of litchi, kaghzi lime, grapevine, etc.

4. Propagation by Gootee

An upright vigorous branch is ringed or incised and the wound covered with Gootee plaster (clay, sand and cotton wool) and wrapped in gunny cloth which is kept constantly moist by water dripping from a clay pot. The branch is cut away below the gootee after rooting. This method is used in the case of litchi, lemon and sometimes mangoes also but this method is successful only in very humid localities.

5. Propagation of Citrus Trees

Citrus trees can be budded on different stocks, viz., khatti, khatti, sweet lime, mokri, kimb, lemon, pomelo and galgal, etc., but maltas and sangtras are usually budded on khatti or mitha stocks. Khatti stock is considered best for maltas, mitha (sweet lime) for sangtras. Seeds are extracted from ripe fruits and all diseased, wormy, wrinkled or shrivelled seeds and those that float on water are discarded and the rest sown in September or February-March at a distance of 1"-2" from each other and 1 ft. from row to row. When seedlings are 6 months' old, weak plants may be rogued out and only sound and healthy seedlings transplanted at a distance of 1 foot from plant to plant and 2 feet from row to row. Budding is done on one or two years' old seedlings either in February-March or August-September. When buds sprout, the strings round the buds are untied and all sprouts coming from stocks are scrupulously removed. One year after budding, the plants become ready for transplanting.

6. Propagation of Peach by Ring Budding

Stones from ripe peach fruits are stratified by burying in moist sand to soften them. They are then sown 6 to 9 inches apart in beds. The seedlings are ring-budded in May. Budwood from best trees is selected and buds carefully removed in form of rings. The bark from the shoot of a stock plant is removed and the ring-bud fitted in place. Plum, mulberry and apricot, etc., are also propagated by ring budding.

Success in budding as well as in grafting depends on the skill of the operator, condition of sap in the plant, healthy growth of the stock and

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scion, and the season. If sap circulation is good, the bark can be easily separated from the wood.

7. Propagation by Enarching

Stones from ripe mangoes are sown in pots or beds in July-August. The seedlings are enarched in the following March or September. Enarching is done by tying together the cut surfaces of a stock branch and a branch of a desirable tree. The union is covered with grafting paste (moist clay and cotton wool beaten together) and bandaged. When union has taken place the graft is removed by cutting the mother branch from below and the stock plant from above the union. Enarching is also done sometimes in case of loquat, guava, and some citrus varieties. Old mango trees of inferior quality can also be made profitable by top working, i.e., branches of inferior tree are grafted over by the shoot of an already grafted mango plant in the pot which is tied with the stem of an inferior tree to be top-worked.

8. Propagation by Cleft Grafting

Cleft grafting is used in order to improve or renovate old trees. The tree is headed back to a few limbs in which clefts are made and graft wood from desirable trees inserted into them. The union is covered with grafting wax and the cleft is bandaged. Wild pears, peaches, plums, apples, etc., are propagated by this method.

9. Top Working of Ber Trees

Old and worthless ber trees can be improved by heading them back to a few limbs and budding over new growth in the following season with desirable varieties.

10. Examination of Sub-soil

The sub-soil can be examined by either digging pits 5 to 6 feet deep or by means of soil auger. A suitable sub-soil should not have a layer of 'kankar,' gravel, coarse sand, hard clay or shallow water table. Best land should be devoted to garden.

11. Layout

Planting of trees should be done in straight rows, by any of the following methods :—

SQUARE. Trees are planted on the four corners of a square. It

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is a comparatively easy method to adopt but the central space in the square remains unutilized.

TRIANGULAR. Trees are planted on the corners of an equilateral triangle. As compared with the square method nearly 15% more trees can be accommodated by this method in the same piece of land.

QUINCUNX. Square method with a fifth tree in centre. It is generally used when planting short lived trees like peaches as 'fillers' in the centre of the square amongst long lived trees like mangoes planted by the square method.

12. Planting Orchard Trees

THE PLANTING BOARD sketch given in the last issue of the journal is a cheap and efficient device for planting trees in straight rows. Circular pits, 3 ft. x 3 ft. are dug and filled with soil mixed with silt or sand and well rotten farm yard manure. The pits should be irrigated and soil allowed to settle for a month before planting. Evergreen trees, i.e., which do not shed their leaves in autumn and which have to be planted with earth ball around their roots are planted both in Spring and Monsoon but deciduous trees i.e., which shed their leaves in autumn can be planted only in Spring when they are still dormant. The 'collar' of the plant should be at ground level and roots spread out in the pit and covered with soil and pressed firmly.

13. Selection of Plants

Selection of good plants is the key-note to success. If the nursery is reliable (and never buy trees from unreliable nurseryman even if plants can be had free of cost) then select plants of medium size, shapely, having clean trunks, abundant roots and vigorous top-growth with uniformly spreading branches and above all free from pests and diseases. Plants should ordinarily be budded or grafted 12 inches from the ground and should be of varieties that are either indigenous or acclimatized. Undesirable plants which should not be purchased are those that are either of unknown parentage, or budded or grafted too high from the ground, or have most branches on one side of the trunk, or the leaves of which show any sign of disease as citrus canker on citrus trees, or knots or gall like formation on roots, etc., etc.

14. Heading Back Young Nursery Trees

Neglect in heading-back or cutting back young plants at the time of planting is responsible for a large number of deaths in the orchard. It is

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done to maintain an equilibrium between the top growth and root system which is heavily reduced while digging from the nursery. It also makes trees low headed which is extremely desirable under Punjab conditions.

DECIDUOUS TREES, viz., peach, plum, apple, pear, etc., 3 to 4 ft. in height are headed back to 1½ to 2 ft.

EVERGREENS, viz., malta, sangtra, etc., 3 to 3½ ft. in height are headed back to 2½ to 3 ft.

GRAPEVINES. All canes are removed excepting one which is upright and this cane is headed back to 3-4 buds.

15. Manuring

Well rotten farm yard manure is the best manure. When this is scarce it may be supplemented with artificial fertilizers, e.g., ammonium sulphate or sodium nitrate. Apply manure by scattering it beneath the spread of the trees' branches and working it into the soil. Avoid exposing roots and dumping manure against the trunk.

GREEN MANURE is an economical method of improving soil fertility.

16. Irrigation

Small and medium sized trees should be irrigated by means of basins of an extent equal to the spread of the top and fed by separate channels. Irrigation by common channels leads to spread of disease, and maldistribution of water and food materials. In case of very large trees flood irrigation is adopted. To avoid water touching the trunk of tree which encourages gum diseases, soil should be slightly raised around the trunk.

17. Packing of Plants

Ever green plants are removed with earth balls which are tied in gunny or banana bark and packed in baskets for transport. Deciduous plants are uprooted and earth around the roots is washed off in water. The roots are then dipped in liquid clay, wrapped in moist moss, and tied together in gunny bag. Immediately after planting, the plants should be heavily irrigated.

18. Protecting Trees from Sunburn

SYMPTOMS. (1) Splitting of bark and exudation of gum. (2) Brown patches on fruit.

REMEDIES. (1) White washing trunks. (2) Wrapping trunks with paper or straw.

For further information please refer to the Fruit Specialist, Punjab, Lyallpur.

CHRONICLE OF THE FRUIT WORLD

1. Concessional Rates for Plants :—With effect from the 8th November 1937, grafts, plants and shrubs are being charged at quarter parcel rates at owner's risk over the N. W. Railway.

We further understand (vide N. W. R. Agent's letter No. 1853R/953 of 14-4-38, addressed to the Honorary Secretary of the Board) that the above concession has been extended to other principal State Railways in India. (All nurserymen and growers are advised to avail of this concession).

2. Messrs. Glacier Products Builds up Agency Relations :—It all goes to the credit of Lala Mehar Chand Mahajan that within a short span of hardly a year, he has been able to establish an up-to-date Fruit Juice Factory in his orchards at Pathankot. Reports indicate that Glacier squashes had a very good reception at the last All-India Exhibition. The well-known firm of Messrs. Spencer & Co. of Lahore has secured all-India sole distributing agency rights for the Glacier products and have already started their summer marketing campaign on an extensive scale.

3. Punjab Agricultural Department Becomes Commercial Minded:—Since the installation of a semi-commercial canning plant at Lyallpur it had been in the air that soon enough fruit products of the Fruit Section would come in the market. Messrs. Bhola Ram & Sons, Ltd., with their extensive branch connections have been appointed as the Sole Agents for the fruit products of the Punjab Agricultural Department. It may be mentioned here that it is not the object of the Agricultural Department to compete with private enterprise in this line but the idea is to meet the expenses involved in running the canning plant which is mainly for instruction purposes of the students and also to try out on semi-commercial scale the formulae and recipes for various products evolved in the experimental fruit products laboratories and to work out the economics of various products as well as to see how these products are received by the public.

4. Railway Freight on Fruit Products :—During the course of discussion on the current year's budget for the Industries Department in the Punjab Legislative Assembly Syed Amjad Ali, M.L.A., the young enthusiastic member of the Parliamentary Standing Committee of the Board observed :—

".....that jam manufactured in England, which imported fruit

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and sugar, was cheaper in Bombay than jam manufactured in the Punjab."

[This may be attributed to the high Railway freight and cost of containers.—Ed.]

5. Patiala to have Gardens in Japanese Style :—His Highness the late Maharaja Bhupinder Singh of Patiala in the closing years of his life became keenly interested in developing modern horticulture in his State. In addition to the appointment of Mr. Charles S. Knowlton of California on a five years' contract for the purpose, in the month of February 1938, he invited two renowned Japanese architects Mr. A. Taniuchi and Mr. A. Nishikama to construct houses and gardens on Japanese style in the State territory.

6. Additional facilities and increase in the Grant-in-aid for the U. P. Fruit Development Board :—In a recent communication the Director of Agriculture, U. P., sums up the facilities which the U. P. Fruit Development Board is enjoying from the U. P. Government as follows :—

- (i) The U. P. Fruit Development Board is in receipt of a grant of Rs. 4,000 per annum since the year 1935-36.
- (ii) During the year, i.e., 1937-38, a further grant of Rs. 2,010 has also been given to the U. P. Fruit Development Board for a marketing scheme for 5 months. From the year 1938-39 a grant of Rs. 4,500 per annum will be given for this marketing scheme. This means a total annual subsidy of Rs. 8,500.
- (iii) The Old Fern House, Sikandar Bagh, Lucknow, has been allotted to the U. P. Board for use as an office and for other activities of the Board, free of rent.
- (iv) One of the departmental officers has been permitted to act as honorary Secretary of the said Board.

7. Revolutionary Changes in Afghanistan Fruit Trade Policy :—Under the direct patronage of the Afghan Government a representative Limited Liability Fruit Marketing Company under the name and style of 'the Afghan Sharkat-i-Samar' has come into being. The said Afghan Company has been given a number of State facilities including the monopolistic rights of export of dry fruits of Afghanistan, which trade hitherto had been in the hands of the Peshawar Fruit 'Arhtias.' This change of the old order

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has hit hard the Indian Fruit traders, and has created a great deal of agitation in the Peshawar commercial circles. The Peshawari vested interests are up in arms to boycott the products of the Afghan Company. Suffice to say that the question has become an All-India one, and requires an early solution. (Some interesting correspondence from an Afghan Correspondent will be published in the next issue.—Ed.)

8. Dr. H. Chaudhuri Honoured :—Dr. H. Chaudhuri, D.Sc., Head of the Botany Department, Punjab University, has been elected the first chairman of the Tropical and Sub-Tropical fruit growing section in the XII International Horticultural Congress to be held in Berlin in August 1938. — "United Press."

9. Activities of the Fruit Section, (Agricultural Deptt., Punjab) :—

(a) **Post Graduate Course in Fruit Preservation :—**The advanced course of seven months duration in fruit preservation will now begin on the 1st June, 1938. The course will include the manufacture of squashes, juices, cordials, jams, jellies, marmalades, vinegar, pickles, the canning of fruits and vegetables, etc., Six students will be admitted. The minimum qualification for admission is the degree of B.Sc. in Agriculture or in Science with Chemistry as one of the subjects. Preference will be given to applicants from the Punjab. All applications must reach the Principal, Punjab Agricultural College, Lyallpur, by 10th May, 1938.

(b) **Experimental Garden at Attari (Amritsar District) :—**An experimental garden of 25 acres sanctioned by the Punjab Government is being planted at Attari along the Grand Trunk Road.

10. Dry Ice and Refrigeration :—With a view to popularise on commercial basis the use of dry ice for refrigeration of perishable foodstuffs, a large scale limited company under the name and style of Dry Ice and Refrigerators Ltd., Lahore, has come into being under the able management of Messrs. Karam Chand Thappar & Bros. Ltd. The Promoters with their cheap novel American method of preparation of solidified Carbon dioxide commonly known to the trade as 'Dry Ice' have created a great stir in the local commercial circles, and it is hoped that they will be able to create and capture a good deal of the refrigeration business of the province.

11. Lahore Horticultural Society :—At the Annual General Meeting of the Society held on March 24, 1938, the following office-bearers were elected for 1938 :—

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Mr. C. Bevan Petman, (President); Mr. J. G. Bhandari, (Vice-President); Miss W. N. Cook, (Honorary Treasurer); Dr. H. Chaudri, (Honorary Secretary); Mr. E. Hughes, (Assistant Honorary Secretary).

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THE PUNJAB FRUIT DEVELOPMENT BOARD, LYALLPUR.

INTERNATIONAL FRUIT WORLD :—

12. Export of Oranges From China to Great Britain :—China oranges called 'Swet-Kom' were shipped to London early this year. These shipments, which have been interrupted by the Sino-Japanese hostilities, were the first on record to be received in London from China. Each orange came in a wrapper marked 'Trade Mark Best' and the not-so-original inscription 'An orange a day keeps the doctor away.'

13. Decline in Citrus Exports of Palestine :—Due to the unsettled conditions in the country it is estimated that not more than 8,500,000 boxes of oranges and 1,500,000 boxes of grape-fruit will be exported from Palestine this season compared with 9,500,000 boxes of oranges and 1,540,000 boxes of grape-fruits in 1936-37.

14. World's Best Oranges :—According to Dr. Tanaka of Japan "Tin-Cheng" of Canton (China) is regarded as probably the best orange of the world from the quality stand-point.

15. Spanish Civil War Tells Upon the Fruit Export:—Shipments of oranges and mandarines by sea from the Levante district of Spain in 1936-37 season were equivalent to 9,000,000 half cases, as compared with 11,500,000 in the previous season and an average of 12,500,000 in the five seasons 1929-30 to 1933-34. The crop was reported to be unusually large, but disturbed conditions in the country interfered seriously with normal trade.

16. Jamaica Exports Oranges :—During the citrus season just passed, 225,000 crates of sweet oranges 70,000 crates of sour oranges and 155,000 crates of grape-fruit were exported from Jamaica.

17. President Roosevelt as Apple Grower:—President Roosevelt's number is 999 as a paid-up member of the New York and New England Apple Institute. Anyone buying a box of apples marked by the Institute seal number 999 will know the apples come from the President's Hyde Park estate.

18. Experiments in Canning of Apple Juice :—Apple juice, served fresh from press, is one of the most healthful of fruit juices. But hitherto no satisfactory process could be evolved to commercially can this juice, which could eliminate the excessive losses from corrosion and hydrogen swelling of the can. But recent continued experiments by Ralph F. Celmer

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and W. V. Cruess, Fruit Products Laboratory University of California on this difficult problem have at last found a way. (For details please refer to "The Better Fruit" magazine of U. S. A., November 1937 issue).

19. Wine Making From Grapes in Washington State :—Making of wine from Washington grapes has been so successful that wineries are now offering to enter contracts for certain grape varieties at specified per ton prices to yield the growers a good profit. Output of one farm winery this year will be tripled over last year's production.

[A tip for growers in the Punjab.—Ed.]

20. Utilization of Tomato-Seed Oil :—Experiments in the use of tomato seed oil as a substitute for linseed oil are being carried out in Italy. The oil obtained is semisiccative and is giving very satisfactory results for paint. The mixture being used is one of 30 per cent, tomato-seed oil, with 70 per cent linseed oil. The economy of the system is ensured by the enormous quantity of tomato seeds available from the canning industry. The grain when pressed fresh gives about 28 to 29 per cent of oil with 7.5 per cent of water. When the dried seeds are pressed, they give 26.3 per cent oil, 30.35 per cent protein, and 5.5 per cent ash. The oil has a composition of 45 per cent olein, 34.2 per cent linolein, 12.47 per cent palmitin, 5.89 per cent stearin and 2.44 per cent of unsaponifiables.

21. Advertising bill of the California Citrus Growers Exchange :—The Exchange advertising bill for the year 1937 amounted to \$1,311,819 (Roughly Rs. 3,935,457), bringing the total advertising investment for the past thirty years to \$24,453,043 (roughly to Rs. 73,359,129).

[Will the Punjab Fruit Growers learn a lesson from it?—Ed.]

22. Carbon Dioxide Preserves Fruits :—By using carbon dioxide mixtures with air as a preservative atmosphere, such perishable fruits as Australian passion fruit have been shipped to England. The original experiments have proved successful and it is expected that other Australian fruits, including pineapples, may be later shipped around the world in this way.

23. Oil for prevention of Frost on Fruits :—Three million barrels of oil are used in California in one cold month to protect the fruit crops from frost, thereby saving the growers from losses which would have aggregated to millions of dollars. The oil is burnt in smudge-pots, and besides supplying heat to atmosphere about the trees, it also sends forth a thick cloud of smoke which aids in dispelling the frost in air.

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24. Soviet Union Agricultural Exhibition :—The opening of the long anticipated Great Agricultural Exhibition of the U. S. S. R. has been fixed for August 1, 1938. Intensive building operations are in progress on the vast grounds (334 acres) of the exhibition at Pushkinskoye on the outskirts of Moscow. The horticultural pavilion is already almost finished and is expected to be a great attraction.

25. Horticultural Exhibition at Essen (Germany) :—Preparations are well advanced for the landscape garden and horticultural exhibition to take place at Essen Germany from April to October 1938. The open-air garden covers 450,000 square yards of ground, and the indoor exhibits 20,000 sq. yards. This is the first exhibition of its kind in Europe, and will arouse considerable interest.

K. L. KOHLI,

M.A., L.S.G.D.

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The Punjab Fruit Development Board

LANDSCAPING BUNGALOW PREMISES

—By—

HARINDAR S. DINSA,
M.Sc. (Kansas) U. S. A.

A fruit garden is a pleasant enough surrounding in which to have one's residence but it is pleasanter still to have a few flowers and flowering shrubs around the bungalow. It is not always the case, as is generally believed, that one has to incur a heavy expense on plants to beautify one's home premises. Some of our common inexpensive, every day plants like corn, castor-bean, sorgham and Dhatura, are most pleasing and decorative when properly planted, mixed with other foliage and flowering plants. Flower growing is a hobby that every one loves provided the pocket can afford it. The main annual expense is the seed which can be cut down considerably by gathering acclimatized seeds from the annuals growing in one's compound.

The satisfactory and permanent results in landscaping the area around a bungalow are obtained by a lawn as a foundation with trees for shade and framework for the lawn and the house, along with shrubs and flowering plants to give a finishing touch and an air of elegance and naturalness to the entire place.

The tall growing foliage plants when massed against buildings, fences, or some other objectionable views such as garage, servants quarters or even kitchen produce a pleasing and harmonizing effect. For temporary and quick effect the following plants are recommended:—Jaint, Arhar, Buddlea, Cornflower, Sorgham, Maize, Castor-Bean, Banana, etc.

It is a matter of common observation in our province that even elaborately landscaped bungalow owners enclose their lawn along the city road with a hedge alone, where perhaps a shrubbery border inside the hedge would be more appropriate. Such a border is planted with the tallest shrubs at the back with less tall in front and so on down to the interior towards the lawn finally ending in front with a bed of annual flowering plants. This arrangement of foliage and flowering shrubs in conjunction with annuals gives a most pleasing and colourful effect but has not yet come into vogue.

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Some of the shrubs for this type of a border along with their height, colour and time of flowering are given below:—

I. Tall Shrubs :—6'—10'.

1. Arundo donax (Reed)	Foliage plant.		
2. Bambusa nana (Bamboo)	Foliage plant.		
3. Bougainvillea glabra	Rosy purple	All year.	
4. Buddlea speciosa	Creamy white also silvery foliage	Spring.	
5. Callistemon lanceo- latus	(Bottle Brush like) Crimson	Summer.	
6. Cassia glauca	Yellow	Winter.	
7. Dombeya acutangula	Pink	Winter.	
8. Dombeya masterii	White	Winter.	
9. Hamelia patens	Orange Red	All year.	
10. Holmskioldia san- guina	Scarlet (cup like)	Winter, Spring.	
11. Jacaranda Mimosi- folia	Blue	Spring.	
12. Tecoma Stans	Yellow	Summer.	
13. Peach (Double flowering)	Pink	Spring.	

II. Medium sized Shrubs :—4'—6'.

1. Acacia Farnesiana	Yellow	Summer.
2. Barleria variagata	Blue with white	Winter & Autumn.
3. Barleria rosa	Pink	Winter & Autumn.
4. Cestrum nocturnum	Greenish Yellow	Spring & early Summer.
5. Crossandra unduli- folia	Orange Red	Spring & Summer.
6. Datura fastuosa	Blue	Summer.
7. Eranthemum pur- pureum	Foliage plant	
8. Hibiscus	Crimson	Summer.
9. Jasminum grandiflorum	White	Winter.

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10.	<i>Murriya exotica</i>	White	All year.
11.	<i>Neruum</i>	Many colours (white, pink, etc.)	All year.
12.	<i>Tabernamontana coronaria</i>	White	Summer.
13.	<i>Poinsettia</i>	Crimson Red	Winter.
14.	<i>Vitex negundo</i>	Lavender	All Summer.
III. Dwarf Shrubs :—2'—4'.			
1.	<i>Asclepias curssavica</i>	Orange Yellow	All year.
2.	<i>Canna indica</i>	Varied colours	All year.
3.	<i>Euphorbia splendens</i>	Scarlet	All Summer.
4.	<i>Hypericum chinensis</i>	Yellow	Winter.
5.	<i>Lantana coccinea</i>	Orange Red	All year.
6.	<i>Plumbago capensis</i>	Blue	All Year.
7.	<i>Nandina domestica</i>	Pretty berries and foliage plant	
8.	Roses	Varied colours	
9.	<i>Russelia floribunda</i>	Scarlet Red	All Year.
10.	<i>Russelia juncea</i>	Scarlet Red	All Year.
11.	<i>Spiraea</i>	White	Spring.

The shrubs listed above present a fairly wide range of height, colour and time of flowering. They should be selected with a view to have colour in the border all the year around. While ordering plants from the "Dwarf Shrubs" group it is better to order more than one plant (preferably four) in order to plant a group because they are more effective when planted in a group of three to four. In the "Tall growing Shrubs" group there are certain shrubs that can be classified as low or sub trees such as Hamelia, Jacaranda, Tecoma, Acacia, etc. Such shrubs along with others require annual pruning to shape them as well as to keep them within bounds. If not pruned, plants like Buddleia and Bambusa are bound to go beyond limits, strangle other plants and loose their own basal shoots and leaves.

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PREPARATION OF TOMATO KETCHUP

—By—

S. S. LAL SINGH,

Fruit, Specialist, Punjab.

Step I.—Take fully ripe, red-coloured tomatoes, wash thoroughly, and trim green and rotten portions.

Step II.—Take the trimmed tomatoes (Step I) and crush them with a wooden ladle in an enamelled pan and boil the crushed mass for 3—5 minutes.

Step III.—Strain the crushed mass through a sieve covered with thin muslin cloth, in order to remove seeds and skin.

Step IV.—Measure the strained pulp (Step III) and weigh out the following amounts of spices, vinegar, sugar, etc., for every 6 gallons of pulp :—

Ingredients.	Approximate amount.
(1) Onions (chopped)	.. 7 chhatanks.
(2) Garlic (chopped)	.. 2½ tola.
(3) Cloves (whole)	.. 1 tola.
(4) Spices (whole), cardimum, black pepper, Zira in equal quantities	.. 1 tola.
(5) Mace (Jalvatri) not ground	.. ¼ tola.
(6) Cinnamor	.. 1½ tola.
(7) Vinegar	.. 1¼ seer.
(8) Sugar	.. 1 seer.
(9) Salt	.. 5¾ chhatanks.
(10) Red chillies	.. 1 tola.

Note.—1 Chhatank or 5 tolas=2 oz.

Step V.—Put the pulp (Step III) along with onions, garlic and spices (loosely tied in a cloth bag) and bring the mass to a quick boil. Add about $1\frac{1}{3}$ rd of prescribed quantity of sugar before boiling and the remainder about the middle of the cooking process. Add vinegar about 5 minutes before boiling is stopped. The product will be of the desired consistency if the pulp in the above process has been boiled down to about $1\frac{1}{3}$ rd of its original volume. Remove the vessel, add salt and mix it thoroughly in the entire mass. Remove the bag of spices.

Step VI.—Pour the product while hot into sterilized bottles (i.e., bottles which have been boiled previously in water for half an hour) and seal them air-tight. Place these bottles in a vessel having a false bottom, cover the bottles with water which may be kept boiling for half an hour. Remove the bottles and store them in a cool dry place.

Further information can be had from the Fruit Specialist, Punjab, Lyallpur.

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ADVANCED FRUIT PRESERVATION COURSE

APRIL—OCTOBER, 1937

—By—

S. S. LAL SINGH,

Fruit Specialist,

Punjab, Lyallpur.

For some years past two short courses of fifteen days each were arranged every year and quite a large number of students hailing from all over India have been applying for admission to the same. The main object of this short course was to popularize fruit and vegetable preservation on a home scale for home use so that people could prepare fruit and vegetable products in season of plenty for use in season of scarcity.

The year 1937, however, marked a distinct advance in the history of the Fruit Section. For the first time it was possible to arrange for an advanced course in fruit and vegetable preservation from April 1 for a period of seven months. This advanced course was arranged with the idea of giving a sound scientific and technical training to a set of post graduate students who would later on help in building up in this province and elsewhere the infant industry of fruit and vegetable preservation.

The class started on the 1st of April, 1937 and seven post-graduate students with degrees in Science or Agriculture were admitted. The class was placed in the charge of a specially appointed lecturer, Dr. G. S. Siddappa, for theory as well as practical work.

Lectures:—Nearly 400 hours were devoted to lectures alone and the lectures delivered were of an advanced nature, dealing with the various fundamental aspects of fruit and vegetable preservation. Students were encouraged to be in touch with the latest work, and help was given in finding out references, abstracting original papers, etc., on important problems dealing with the subject. A series of lectures on the fundamental aspects of fruit culture were arranged in order that students might also familiarise themselves with the horticultural aspects of the fruit preservation industry. Frequent visits to the experimental orchards proved to be highly instructive since they helped to add much to the knowledge of the students which was previously limited to chemistry, physics or botany.

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A great deal of time was devoted to the discussion of the fundamental principles underlying the preparation of jams and jellies and the factors responsible for the spoilage of canned foods and bottled juices. The problems were highly theoretical and called for an understanding of the fundamentals of many of the basic sciences like chemistry, physics, botany, etc.

Practical Work:—The students were fortunate enough to have at their disposal facilities that enabled them to carry out a vast series of experimental trials on many aspects of the fruit and vegetable industry. The newly equipped Canning Hall was a great asset and proved of considerable help in giving the students an insight into the working of an ideal modern fruit preservation factory. Every attempt was made and successfully made to awaken and foster in the students the idea of original outlook in the investigation of any problem and to maintain that outlook throughout. Of the several subjects investigated, I may refer, to a few of them only, to the work on the preservation of the ber (*Ziziphus jujube*) and the loquat, the preparation of vinegar from cull fruit, the semi-commercial preparation of tomato ketchup and tomato juice, the drying of melons, peaches and plums, the preparation of grape juice and the canning of peas, green gram, etc. Some work was also done on the utilisation of mangoes and other essentially tropical fruits. The students had also the unique opportunity of canning two lorry loads of pears from Kullu. This enterprise was the first of its kind in Northern India. Although the work in the laboratory was of an arduous nature and involved working long hours from early in the morning till late in the evening, the students enjoyed it with the proud feeling that they were doing pioneer work, breaking up new ground and exploring fresh fields.

Visit to Experimental Gardens:—Early in July a short tour of six days to some important commercial orchards in the Province was arranged. Sardar Mangal Singh's garden at Shahdara, Captain Mitchell's orchards and juice factory at Renala Khurd, Dr. Cheema's orchard and the citrus root stock trials at Montgomery and several other gardens near Lahore and Amritsar were visited during the course of the tour which proved highly interesting and instructive.

The first batch of trained students went out with the best of wishes and some of them have already proved their mettle by successfully running fruit preservation plants, especially squash factories, of which they were put in charge. The second batch of students would be admitted on June 1, 1938 for which applications from candidates are being invited.

WHY FRUIT CURES SUCCEED

—By—

DR. W. SCHWEISHEIMER

An old clergyman over ninety years of age was convinced that he must ascribe his health and elasticity to the fact that every year he went on one or more fruit cures as a matter of routine. He looked upon this as a kind of safety valve for dietary mistakes.

Wise people give fruit a place in the daily diet throughout the year. To a certain extent they follow a fruit cure regularly. In America and England it is customary to start breakfast with fruit or fruit juices. This acts as an intestinal stimulant. A similar effect may also be achieved, in most cases, by eating fruit, raw or stewed, in the evening. It is astonishing how sluggish intestines may be trained to regularity by small doses of fruit, even if only five or six raw prunes.

Naturally this may become habit-forming, but in contrast to other medicines it is harmless. When one is accustomed to the daily enjoyment of fruit, one minds its omission tremendously, as for instance, on a trip. One becomes subject to unpleasant sensations of auto-intoxication if the digestive residue stays in the body too long.

Grape cures, says Dr. W. Schweisheimer in 'New Health,' constitute a model example of the fruit cure. They attract many people in the late summer and autumn to vineyards. However, such cures may be carried on at home. They are not new; even Hippocrates recommended them. The only new feature is the special interest which nowadays is again being aroused in cures through diets.

At the beginning of the grape cure small quantities of two or three pounds a day are taken; this is gradually increased to five and eight pounds, and still more. The daily quota is divided among three or four meals. Skins and seeds are frequently removed. Furthermore, sensitive people use only grape juice. The gums and the mucous membranes of the mouth may become irritated. For that reason the gums require careful attention, the mouth should be rinsed with alkaline mouth washes. The remaining diet should omit milk and cream, also other liquids such as great quantities

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of water, soup, alcoholic beverages. In any case the large water content of grape quenches all thirst.

Stimulant on Intestines

Because of the large water content of fruit the important thing achieved is a thorough flushing of the system. Man does not like to consume great quantities of liquids in the form of water. In the guise of fruit, which consists of more than 80 per cent water it is more palatable.

The immense quantities of liquid flush the system thoroughly, cleansing everything—blood vessels, organs, tissues, cells. All the residue of metabolism is washed out of the remotest lurking places, eliminated by kidneys or intestines, given off by the lungs or through the pores of the skin. It works just as when an abundance of water is pumped through a sewage system, and as it flows along carries with it all the remaining particles.

The cellulose substance of fruit acts as a stimulant on the intestines. The residue of metabolism is eliminated, and the lodging of toxic matter in the body for a long time is thus prevented. The joy of living, capacity for work, the vanishing of pain and feelings of depression, the disappearance of skin diseases are the immediate results. Being rich in vitamins, certain fruit acids and mineral salts, fruit provides the material for building up the body, which it needs. The disappearance of symptoms of illness often follows.

Special Powers

These basic effects are typical of all fruit cures, regardless of whether one uses grapes, pears, apples, any variety of berries, grapefruit, etc. In addition, certain kinds of fruit are reputed to possess very special powers. The beneficial effects of strawberry cures in anaemia and chlorosis is attributed to their iron content. But since strawberries are usually served with milk or whipped cream as part of the diet, the recovery of such invalids is due, possibly, to the richer fare. In certain people strawberries produce urticaria; the reference has, therefore, been drawn that strawberries produce a special effect on the skin in general. This point has not yet been clarified.

Since olden times grape-cures have been used for chronic cases of bronchial and lung diseases. They are reputed to have a salutary effect in such illness, without conclusive scientific proof having been established to date. Lemon cures are indicated for scurvy and similar diseases. Scurvy is caused by a lack of vitamin C, compensated by lemon juice which is rich in vitamin C. Formerly, lemon cures were used extensively in 'reducing.'

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Then the juice of a number of lemons (even as many as ten and fifteen) was mixed with sugar and water. Lemon juice as such cannot make one to lose weight. That is only possible when at the same time the general amount of food taken is correspondingly decreased.

The delicious flavour of fruit facilitates the carrying out of cures of considerable length. In kidney disorders, for example, a special fare, free of salt and protein, is prescribed. That makes it difficult, for the monotony of such a fare for any length of time goes against the grain of the invalid (who has to keep it up), so that the addition of fruit in this case constitutes a welcome change. In the case of high blood pressure the consuming of fruit is an advantage, in itself preventing one from taking too much protein. In diabetes, setting aside certain days when a variety of fruits is eaten has proved helpful. It is permissible for diabetics to eat even grapefruit; it is true this fruit contains sugar, but it produces such a stimulating and refreshing effect on the diabetic that it is considered excellent.

In 'reducing diets' fruit cures are being used more and more. Fruit, indeed, contains comparatively little nourishment, yet it satisfies the appetite completely. The stomach becomes filled without too many calories entering the body. To 'reduce' one may either adhere to a regular fruit-cure lasting several weeks, at the same time taking bread, rice and other carbohydrates; not much fat, but eggs, some meat or cheese to supply proteins. Or in other reducing cures, two days a week are set aside for fruit, whereby the prescribed amount of calories is principally realised by means of fruit. Inversely, grape cures may be used in fattening cures; in this case sweet grapes are not used in place of other nourishing foods, but to supplement a fare that is otherwise rich.

Gout is particularly adapted to fruit-cures, because of the excessive amount of uric acid in the body. The same is true of kidney stones. Food that gives the body too much uric acid must be avoided. Fruit is free of it; fruit-cures therefore, eliminate from the body any remaining uric acid. Even when not on a cure, a person suffering from gout will find fruit diet beneficial. Most of the advantages of fruit-cures apply also to cures with fruit juices.—The "Daily Herald," Lahore.

CITRUS CANKER AND ITS CONTROL

The Canker disease occurs on citrus plants, i.e., Malta, Sangtra, Lemon, etc., to a small extent in almost every garden. In certain places over 20 per cent of the plants have been found to be affected and serious damage has also been done to the fruits.

The disease is caused by the bacterium, *Pseudomonas Citri*, Hasse.

Symptoms.—The disease appears generally on the leaves and fruits in the form of yellowish brown, corky, swollen spots. On the fruits which are chiefly affected, the canker spots may remain isolated or in severe cases may coalesce giving a scabby appearance. In such cases the fruits are disfigured and rendered unfit for presentation in the market. The part of the fruit under the scabby rind is generally very deficient in juice. When the attack is severe, branches are also involved and bear scabby growth. Young new shoots are much more susceptible than older well-matured branches, and young trees and nursery plants than old trees.

Mode of Perennation of the Disease.—The causal organism cannot persist either in the soil or on the fallen leaves. It is carried through the winter on old diseased spots on leaves and twigs. When warm weather sets in, the infection spreads to healthy leaves, fruits and twigs. If the conditions are favourable for the life activities of the bacteria, the disease assumes serious proportions. Wind and insects also help in spreading the disease from one place to the other.

Control Measures.—Experiments carried out for the control of canker have shown conclusively that the disease can be effectively checked by spraying with Bordeaux mixture. In one garden affected up to 60 per cent with the disease, three applications of Bordeaux mixture by spraying were found sufficient to free the plants of it.

Bordeaux mixture is a preparation of copper sulphate, lime and water. It should be prepared according to the following formula:—

Copper Sulphate	4 lbs.
Lime	4 lbs.
Water	50 gallons.

Detailed directions for the preparation of Bordeaux mixture are given in leaflet No. 94 (of the Punjab Agricultural Department).

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The first spraying should be applied in the beginning of August, when the fruit is young. Subsequent applications should be made at intervals of one month. Every year, after the fruit has been plucked, all branches and leaves bearing canker spots should be removed and burnt. Any leaves dropped from the trees should also be carefully collected and destroyed. In this way the source of infection of the disease will be suppressed. Although in any particular garden, the plants of which have been treated with Bordeaux mixture, the disease may be completely eliminated yet there is a possibility of its re-appearance, in case any other garden in the vicinity is affected by it. Hence, to control the disease permanently, it is absolutely necessary that all gardens affected by it should be treated simultaneously, so that there is no chance of any secondary infection.

For any further information on the subject, the Professor of Botany, Punjab Agricultural College, Lyallpur, may be consulted.

DO NOT FORGET TO FEED YOUR FRUIT TREES

YOUNG FRUIT TREES

not in bearing should
be given 2 to 6 lbs of

YOUNG FRUIT TREE FERTILISER

Analysing :

4·2 per cent Nitrogen
5·4 per cent Phosphoric Acid
8·0 per cent "POTASH"

half to be applied before the rains and half
after the rains

OLD FRUIT TREES

in bearing should be given
7 to 15 lbs of

OLD FRUIT TREE FERTILISER

Analysing :

3·5 per cent Nitrogen
7·2 per cent Phosphoric Acid
10·0 per cent "POTASH"

half to be applied just before flowering and half
just after harvest.

Further information on the manuring of Fruit Trees may be
obtained from :

THE
**OVERSEAS POTASH EXPORT
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8, Infantry Road, BANGALORE, (South India.)

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The Bharat Insurance Company Makes Headway

It is indeed a matter of great pleasure to know that the Bharat Insurance Company has completed fresh business in 1937 worth over 2 Crores and Five Lakhs. Our readers are well aware of the nerve-taking times which overshadowed the prosperity of the Company from the year 1930 onward, till sometime in the middle of the year 1936, so much so that the business dwindled down to a shocking figure of about 20 Lakhs only in 1935. Then came in the present management under the Chairmanship of Seth Ramkrishna Dalmia.

The new management undertook this great and comprehensive responsibility only sixteen months back and during this infinitely shorter time the Company has made unprecedented progress to the entire satisfaction of the public. The "Bharat", the pioneer institution of India for which some of its ardent admirers had already shed their tears of agony, now stands like a solid rock.

A NEW INDUSTRY Kangra Valley Fruit

It is a great pleasure to note that a new industry has been started in Pathankot by M/s. Glacier Products, India.

This industry is likely to capture the Indian Market and is worthy of support in as much that it tends to replace foreign made articles and gives an added incentive to fruit growers in that famous fruit valley, The Kangra District.

THE GLACIER PRODUCTS, PATHANKOT, are now manufacturing fruit Squashes from fresh fruit and pure cane sugar, and they have been successful in producing some of the finest squashes in the country.

These squashes are prepared by modern machinery and guaranteed against impurities. A highly qualified chemist is incharge of the factory and all products are carefully tested before being put on the market. The retail price has been kept remarkably low so as to popularise pure fruit juice amongst all classes of people in the province. The value of citrus fruit juice as a valuable food is too well known and each bottle of glacier's squashes is full of this health giving juice.

THE NEXT ISSUE

The next issue of the Journal which will be out in July next will contain, besides a number of other interesting items, an important contribution by Dr. G. Lal, Assistant Fruit Bio-Chemist, Punjab, on the preparation of Jams and Jellies. The issue will also contain a detailed Directory of important Fruits grown in the Punjab.

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ANNALS OF THE BOARD

[With a view to keep the members of the Punjab Fruit Development Board in touch with the activities of the Managing Committee and the various Standing Committees of the Board this Section is being made a regular feature of the Journal.]

The Annual Meeting of the Board was held at Town Hall, Lahore, on 12th January, 1938 under the chairmanship of the Hon'ble Ch. Sir Shahab-ud-Din. The Hon'ble R. B. Ch. Sir Chhotu Ram, Minister for Development and Vice-Patron of the Board, delivered the Annual Address which along with the Presidential Address appears elsewhere in this issue. The following are some of the important decisions arrived at in the General Meeting:

1. **A Deputation to Wait on the Hon'ble Minister for Revenue :—** The members made a general complaint against the treatment meted out to them by the Punjab Irrigation Deptt. by not giving them sufficient water for gardens, and the House unanimously resolved that a deputation of the Board should wait upon the Hon'ble Minister for Revenue to represent the feelings of the fruit growers in the matter. It was further decided that the Minister for Revenue be approached to arrange for the presence of the Chief Engineer, Irrigation Department, Punjab, when receiving the deputation of the Board. The matter has been referred to the Parliamentary Standing Committee for their seeing it through at an early date.

2. **Demand for Pedigreed Plants :—** During the course of the debate on the initiation of the Bud Selection programme under the auspices of the Board speaker after speaker strongly urged that just as Government was supplying good seed to people for growing better crops of wheat, cotton, etc., it should also come forth to assist the Board in supplying pedigree quality plants. After a great deal of discussion it was decided that the Punjab Government be once again approached to consider the proposals already submitted by the Board, and render adequate special financial assistance for the scheme over and above the meagre general subsidy asked for. This work should have been taken up by the Government at the very inception of the Fruit Section as this forms the foundation of the fruit industry and it should not be delayed any further.

3. **The Punjab Fruit Show:—** S. B. Hari Singh proposed that the Provincial Fruit Show should be held under the auspices of the Punjab Fruit

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Development Board and the Department of Agriculture Punjab should assist in the matter. In any case the Fruit Show should cease to be a mere departmental affair. At the suggestion of L. Mehar Chand Mahajan, the proposal was referred to the Managing Committee for detailed consideration.

4. Amendments in the By-Laws of the Board :—The following amendments in the By-laws which had the approval of the Co-operative Department were moved and passed.

- (i) Amended By-law 16 (2):—"The General Body of the Board may empower the Managing Committee of the Board to (a) to elect as many Standing Committees and Sub-Committees as may be considered necessary by the Managing Committee for performing various functions; (b) to delegate these Standing Committees and Sub-Committees such powers as the Managing Committee may deem advisable."
- (ii) Amended By-law 21 :—"The Managing Committee shall hold its meeting when necessary. At least 7 days' clear notice shall be given for every meeting of the Managing Committee. The attendance of 4 members shall be required for the disposal of any business; but when a meeting is adjourned for want of quorum the business of the adjourned meeting shall be transacted irrespective of quorum."
- (iii) Amended By-law 24 (6):—"The Committee may delegate to the Officers of the Board such of its own powers as may be prescribed by a General Meeting."

[The above amendments have been duly registered by the Co-operative Department.—Ed.]

5. Managing Committee and Office-Bearers for the Year 1938 :—

The following were elected as Office-bearers and Members of the Managing Committee for the year 1938 :

1. The Hon'ble Ch. Sir Shahab-ud-Din, Speaker, Punjab Legislative Assembly (President).
2. The Hon'ble Mr. Justice Bakhshi Tek Chand, Judge High Court, Lahore (Vice-President).
3. Capt. L. Mitchell of Indian Mildura Fruit Farm, Renala Khurd.

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4. S. B. S. Hari Singh, 96—F Model Town, Lahore.
5. S. Satwant Singh, Rais 145|9 L. Chak, Montgomery District.
6. S. S. S. Hukam Singh, Jietee Gardens, Chak No. 45—G. B. via Gojra, District Lyallpur.
7. Dr. Mushtaq Ahmad, P. V. S. Class I Veterinary College, Lahore, (Joint Secretary).
8. L. Mehar Chand Mahajan, 23, Abbott Road, Lahore, (Treasurer).
9. L. Duni Chand, Bar-at-Law, 25—A, Jail Road, Lahore.
10. S. S. S. Ujjal Singh, M. L. A., 24, Wellington Road, the Mall, Lahore Cantt.
11. Nawab Mohammad Shah Nawaz Khan, M. L. A., Mamdot Estate, Ferozepore District.
12. S. Kartar Singh, Dewana, Chak No. 370, Sardarwala, Sheikhupura District.
13. L. Balak Ram, Bar-at-Law, Ganga Niwas, Lower Mall, Lahore.
14. K. S. Niaz Ali Khan, Jamalpur Fruit Farm, Sarna, near Pathankot.
15. S. Nahar Singh, Managing Director, Grewals Nursery, Bishan-pura, P. O. Doraha, District Ludhiana.
16. R. S. Janki Das, Prop. Janki Das & Co., Nila Gumbad, Lahore.
17. Lt. Naunihal Singh Mann, M. L. A., Hon. Magistrate, 1st Class, Rais Azam, P. O. Mananwala, District Montgomery.
18. Sardar Mohd. Husain, M. L. A., Rais, Gojra Kalan, P. O. Worsely Ganj, Tehsil Chunian, District Lahore.
19. S. Sampuran Singh, M.L.A, Lyallpur.
20. Nawab Ahmad Yar Khan Daultana, M.L.A., 3, Durand Road, Lahore.
21. Syed Amjad Ali, M.L.A., Ashiana, Canal Bank, Lahore.
22. R. S. Chuni Lal, Manali, Kulu, District Kangra.
23. Mian Nur Ullah, M.L.A., Lyallpur.
24. Nominee of the Amritsar Municipal Committee.
25. Ch. Nazar Mohammad, P. O. Sardarpur, Chak 17|11. 4. L., Sub-Tehsil Renala Khurd, District Montgomery.
26. The Financial Commissioner, (Development) Punjab.

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27. The Director of Agriculture, Punjab.
28. The Commissioner, Rural Reconstruction, Punjab.
29. The Chief Engineer, Irrigation Works, Punjab.
30. The Fruit Specialist, Punjab, Agricultural College, Lyallpur, (Honorary Secretary).

6. **The Newly Elected Committee Meets :**—The inaugural meeting of the newly elected Managing Committee was held on 28th February 1938 at the 'Pipals,' Lahore, and the following important Standing Committees and Sub-Committees were formed therein :

(1) **Fruit Journal Standing Committee :—**

1. Mr. Mitchell of Messrs. Indian Mildura Fruit Farm.
2. Professor Mushtaq Ahmad.
3. R. S. Janki Dass.
4. Nawab Ahmad Yar Khan Daultana, M.L.A.
5. S. Satwant Singh.
6. S. Kartar Singh Dewana.
7. S. S. Lal Singh,—(Honorary Secretary).
8. Mr. K. L. Kohli,—(Assistant Secretary).

(2) **Fruit Marketing Standing Committee :—**

1. L. Mehar Chand Mahajan, Advocate.
2. S. B. Hari Singh.
3. Mr. Mitchel of Indian Mildura Fruit Farm, Renala Khurd.
4. K. S. Niaz Ali Khan.
5. S. Kartar Singh, Marketing Officer, Punjab.
6. Mr. Amjad Ali, M.L.A.
7. L. Duni Chand, Bar-at-Law.
8. S. S. Hukam Singh.
9. S. S. Lal Singh,—(Honorary Secretary).
10. Mr. K. L. Kohli,—(Assistant Secretary).

(3) **Parliamentary Standing Committee :—**

1. S. S. Ujjal Singh, M.L.A.
2. Nawab Ahmad Yar Khan Daultana, M.L.A.

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3. Mr. Amjad Ali, M.L.A.
4. S. Sampuran Singh, M.L.A.
5. Mian Nur Ullah, M.L.A.
6. S. Mohammad Hussain, M.L.A.
7. Lieut. Naunihal Singh, M.L.A.
8. S. S. Lal Singh,—(Honorary Secretary).
9. Mr. K. L. Kohli,—(Assistant Secretary).

(4) Land Standing Committee :—

1. S. S. Hukam Singh.
2. S. Satwant Singh.
3. Mian Nur Ullah, M.L.A.
4. S. Sampuran Singh, M.L.A.
5. Ch. Nazar Mohammad, Honorary Magistrate.
6. S. Kartar Singh Dewana.
7. The Director of Agriculture, Punjab.
8. The Financial Commissioner (Development) Punjab.
9. S. S. Lal Singh,—(Honorary Secretary).
10. Mr. K. L. Kohli,—(Assistant Secretary).

(5) Bud Selection Standing Committee :—

1. K. S. Niaz Ali Khan.
2. Mr. Mitchell of Indian Mildura Fruit Farm.
3. S. Kartar Singh Dewana.
4. S. S. Hukam Singh.
5. Professor. Mushtaq Ahmad.
6. S. S. Lal Singh,—(Honorary Secretary).
7. Mr. K. L. Kohli,—(Assistant Secretary).

7. A Deputation to Wait on the Hon'ble Minister for P. W. D. :—

The last Managing Committee of the Board in its meeting of 10th January 1938 decided that an influential deputation of the Board should wait on the Hon'ble Minister, P.W.D., Punjab, with a view to discuss with him the ways and means as to how best the co-operation and financial assistance of the various local bodies of the province should be secured to push the cause of

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the Board. The matter has been referred to the Parliamentary Standing Committee for an early action.

8. Demand for Supplementary Provision of Grant-in-Aid for the Board :—It is becoming increasingly apparent that any sum less than Rs. 5,000 per year would hardly be sufficient to meet the bare minimum requirements of the Board. Taking the above in view the Managing Committee in its meeting of 28th February 1938 reiterated the earnest desire of the General body in the matter, and decided that a deputation of the Parliamentary Standing Committee should wait on the Hon'ble Premier Punjab and other Hon'ble Ministers, with the request that a supplementary provision be made in the current year's budget to grant an additional subsidy of Rs. 2,500 over and above the one sanctioned already, and further that the said grants be made recurring.

[This matter is having the close consideration of the President of the Board.—Ed.]

9. Fruit Marketing Scheme :—Mr. H. R. Stewart, Director of Agriculture, Punjab, along with the Hon'ble Secretary of the Board waited on the Administrator, Lahore Municipality, to discuss with him to secure the co-operation of the Lahore Municipality in the proposed Central Fruit Market which is to be started under the auspices of the Board at Lahore. The matter was referred to the Secretary, Lahore Municipality for further investigation and report.

K. L. KOHLI,

M.A., L.S.G.D.

What Are You Going To Do This Year To Increase Your Profits ???

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HORTICULTURAL KNOWLEDGE FROM FAR & NEAR

—By—

SANGAT SINGH, M.Sc. (Agr.).

Fruit Section, Lyallpur.

[Horticultural science though of recent origin is making rapid strides. Research workers at various Research Stations all over the world are constantly publishing the results of their labour in scores of technical bulletins and foreign periodicals, to which an average reader can have no access. For the benefit of our readers, it has been decided to report the results of the latest developments in horticultural science in the form of brief extracts, which will be a regular feature of the Journal. In this issue, however, we are not able to devote sufficient space to this section, as the major bulk of this issue has been taken up by matters relating to the Annual Meeting of the Board.—Ed.]

Colouring of Apples

Apples, if they are good coloured, fetch high price in the market. Lt.-Col. G. Speir conducted an experiment on colouring of apples, in England in the fruit growing regions towards North of the Tweed river. He found that certain varieties of apples have their colouring greatly intensified by being temporarily stored, stem downwards, in close rows on a well mown grass lawn for periods of from 3 to 12 days. The fruit was covered with nets to protect it from birds. The treatment started from August 20th to the end of October, the date and length varied with the variety. The apples which respond well to this treatment are James Grieve, Cutler Grieve, Epicure, lady Sudeley, Rival and Cox's orange Pippin.

[Our hill fruit growers may give it a trial.—Ed.]

The Effect of Time of Thinning on Apple Size

Thinning operation, i.e., removing a certain amount of fruit from the tree in early stages to lighten its burden, is of great practical importance in the orchard. Knowlton carried out experiments for three years in West Virginia, U. S. A., to study the effect of time of thinning on apple size. The varieties tried were Oldenburg, Golden Delicious, Delicious, Grimes and Wealthy. The trees were thinned at different times from June to the end of August and check trees were left unthinned. The results indicate that the earlier the thinning the larger is the size of fruit at harvest time. On the other hand early thinning may prove disadvantageous in case of occurrence of severe hail or dust storm later on which may shed the fruit considerably. Since studies made elsewhere have also shown that the earlier

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thinning promotes annual cropping in varieties which normally bear Biennial Crop, it would seem desirable from a practical stand-point to thin these varieties early and leave the thinning of other varieties to some later time.

Spring and Mid-Summer Application of Nitrogen in Apple Orchard

The various American workers were of the opinion that heavy application of available Nitrogen when applied in early spring in a single dose disappeared by mid-season. In order to see how far this conception was true in case of apples, Potter, University of New Hampshire, Durham N. H., U. S. A., carried out an experiment for 5 years in which he split up the application of manure in two doses. The varieties of apples under trial were McIntosh, Baldwin and Rhode Island. The yield, size of fruits, colour, set of fruits, twig growth and trunk growth were compared with those trees on which all the Nitrogen was applied at one time. Although in most cases there was a slight gain when the application was divided yet the differences were in no case significant.

"Pruning of Citrus"

In the absence of any comprehensive experimental work no definite rules can be laid down for the pruning of citrus, but in the article on "Pruning of citrus in Algeria" Brichet discusses the general physiological factors involved in pruning citrus trees in North Africa. The shoots borne on citrus are divided into three main groups.

(1) **Fruiting Shoots**, which are slender, slow growing, generally horizontal or drooping and bear medium to small leaves. It is generally desirable to leave them unpruned for 3 to 4 years after which their fruiting capacity is apt to decline and it becomes desirable to replace them by younger shoots.

(2) **Vegetative Shoots**, which are erect, quick growing and bear larger, coarser leaves. After one or more seasons these normally bear fruit of rather inferior quality near the apex. This causes them to curve downwards and assume a horizontal position and then usually give rise to a succession of further vegetative shoots which follow the same course.

(3) **Water shoots**, which usually arise in the centre of the tree as a result of too drastic or ill-timed pruning. These should be removed as early as possible unless they are required to replace an old branch which has died. In shaping young trees a low stem is nearly always to be preferred

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to a high one. Hollow spherical form is much to be preferred to an open vase shaped form.

Humus and Cover Crop in Relation to Orcharding

It is claimed by Stephenson of Washington State of U. S. A. that next to water, humus is the most important factor in influencing the growth and yields of trees. The effect of continuous clean cultivation is to deplete the humus, and results in leaching of nitrates and deterioration of soil texture. Therefore the provision of ample humus is the first essential and where orchards are normally clean-cultivated and no farm yard manure is available, it is suggested that cover-cropping especially with legumes is the cheapest and most effective means of supplying humus in the orchard.

Effect of Soil Temperature on Growth

Halma working in Southern California carried out tests of the effect of soil temperature on the growth of citrus. For this purpose he took one year old rooted cuttings of Eureka Lemon, Marsh grape-fruit and Valencia orange and kept them at three ranges of temperature (16° to 27°C , 12° to 22°C , and 3° to 20°C) during the winter and spring months. The results showed that the lemon made greatest total growth at the highest temperature range and the grape fruit and orange at the intermediate temperature range. Grape fruit made little and orange practically no growth at the lowest temperature range and it is concluded that they both show a smaller degree of adaptability to soil temperature than does lemon.

Young Grape Fruit Trees Never Grow Big Unless Watered Right

The head gardener at the University of Arizona a man of Mexican descent, stated the following aphorism "Once a little tree always a little tree." From the studies made on the Yuma Mesa during the past 10 years, there was found a considerable truth in that maxim. A deficiency in growth during the early years persists and the trees do not "catch up" in later years. The first years of growth are, therefore important.

The irrigation Department, 5 years ago, initiated tests of various irrigation practices and methods of soil temperature. One plot was sown with Alfalfa. Although the Alfalfa depressed the soil temperature effectively yet the trees made no growth whatever.

The plot on which cow-pea was sown about the end of May and was buried in late September provided much better conditions for the growth of young grape fruit plants.

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The best growth was on the plot on which a mat of coarse non-heating straw mulch was placed around each tree early in June and removed in late September; the mulch kept the soil cool and there were no unfavourable influences. There can thus be no doubt that this is the best treatment for young orchards. A straw mulch with 2 or 3 weeks' interval is vastly preferable to weekly irrigations on bare soil, even in the case of loose porous sandy soil of Yuma Mesa.

The treatments were discontinued after 3 years and the plots, since then, have been kept bare. They were given bi-weekly irrigation during the hot summer. Under this regular orchard irrigation, trees on all plots made good growth but the trees which were straw-mulched when young still outstood the others.

There were other tests conducted by the horticulturists and irrigation departments jointly where irrigations were given after 1, 2, 3, 4, 5, and 6 weeks' interval over a period of 5 years from 1927 to 1932. The development of trees was in the order of irrigation frequencies, i.e., the trees which had the early advantage of one week irrigation had twice the volume and the productive capacity.

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Vol. 2

LYALLPUR, JULY 1938.

No. 7

WILL LAHORE MUNICIPAL ADMINISTRATION AWAKEN TO ITS RESPONSIBILITIES ?

The consumption of fruits and vegetables in Lahore has increased greatly in recent years all to the advantage of the Lahore Municipality. We reproduce below some telling figures regarding the quantities of vegetables and fresh fruits imported into Lahore in the year 1936-37 as mentioned in a letter addressed by the Administrator, Lahore Municipality, to the Honorary Secretary, of the Punjab P. C. Fruit Development Board:—

	Weight	Terminal Tax		
	Mds.	Srs.	Rs.	a. p.
Vegetables				
by rail ..	50,446-23	5,517-	8-6	
Vegetables				
by road ..	1,74,164-13	19,049-	3-6	
Total ..	2,24,610-36	24,566-	12-0	
Fruits by				
rail ..	2,95,207-	0	55,351-	5-0
Fruits by				
road ..	1,68,123-28	31,523-	13-0	
Total ..	4,63,330-28	86,875-	2-0	

The Municipality of Lahore is enjoying an annual revenue of over a lakh of rupees as terminal tax from these im-

ports, but in return is rendering no corresponding service to the fruit industry, except that of running a small retail fruit and vegetable market known as the Tolinton Market. We venture to awaken the Lahore Municipality to its responsibilities in helping the Punjab Fruit Development Board to run a modern fruit market at Lahore which would ensure the supply of wholesome fruit sold under perfect hygienic conditions.

K. L. KOHLI.



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Approved by the Education Department
Punjab

The Director of Public Instructions, Punjab, vide his memorandum No. 16443—C, dated 4th August, 1938, has been pleased to approve of the Punjab Fruit Journal as an approved publication for schools in the Punjab.

(It is hoped that District Inspectors, Head Masters of high and vernacular schools, and heads of Public Libraries of the Province will liberally patronize this journal by subscribing for it for the educational institutions under their control.—Ed.)

CHRONICLE OF THE FRUIT WORLD
INDIAN SECTION

1. Indo-Afghan Fruit Trade Settlement :—It will be recalled that some time ago the Afghan Government set up a company, known as the "Afghan Sharbat-i-Samar"; to take charge of export trade in the dry fruits of Afghanistan on a monopolistic basis. As this measure was calculated to throw out of employment all Indian traders in Afghanistan and in India, Indian traders, who were badly hit by this monopolistic move, resorted to an intensive country-wide boycott of Afghan dry fruits, and so strong was this movement that the Government of Afghanistan invited Indian traders to a conference. But when the deputation of the Indian traders was about to leave for Kabul, news was received officially that the Afghan Government had decided to cancel the monopoly enjoyed by the 'Sharbat' in so far as it related to the marketing of fruits. It appears that there will now be no necessity for a delegation of fruit traders to visit Kabul as the sale of fruits in Afghanistan will from now on be unrestricted.

[A well-deserved victory for the Indian traders.—Ed.]

2. The Kashmir Fruit Trade and the Murree-Kashmir Motor-Bus Strike :—Latest advices from the Kashmir Valley indicate that the intensive motor bus strike on the Murree-Kashmir Road during the months of May and June 1938, resulted in considerable disloca-

tion of the Kashmir fruit trade this season. It created an apparent glut in the Srinagar fruit market in spite of the fact that there was considerable under-production this year.

3. Vegetable Specialist for the Punjab :—Encouraged by the achievements of the various Specialists in the Agricultural Department, the Punjab Government, from this year, has made provision for the creation of the post of a Vegetable Specialist at Lyallpur in class I of the Punjab Agricultural Service. Applications for the post have been invited, and it is expected that systematic work on this promising and paying branch of agriculture will be commenced, in right earnest, in the coming winter.

4. Office-bearers of the U. P. Fruit Development Board :—The following are the office-bearers of the U. P. Fruit Development Board for the year 1938:—

PRESIDENT.—P. B. Richard Esquire, I.A.S., Director of Agriculture, U. P.

VICE-PRESIDENT.—Vishnu Sahay Esquire, I.C.S., Cane Commissioner, U. P., Lucknow.

HONORARY SECRETARY.—John A. Munawwar Esquire, Provincial Marketing Officer, U. P., Lucknow.

HONORARY TREASURER.—Rai Sahib Anand Behari Lal.

HONORARY PROPAGANDA OFFICERS.—K. S. Abdul Bari Khan, and M. L. Garg Esquire, Proprietor, L. R. Brothers, Saharanpur.

ASSISTANT SECRETARY.—S. C. Man Singh Esquire, L. Ag.

5. Reward for Discovering the Cause and Remedy of Non-setting in Mango :—A reward of Rs. 100 has been announced by Messrs. L. R. Brothers, Nurserymen, Saharanpur, to be awarded to the person who discovers the causes and successful remedies of oozing of mango sap ("Lasa" or "Chep") at the time of mango flowering and apparently causing non-setting. For further particulars please write to Messrs. L. R. Brothers, Saharanpur.

6. Mangoes for the King :—Thirty-five kilos of Indian mangoes arrived by the Imperial Airways flying boat "Centauros" addressed to H. H. the Aga Khan, who gave orders that they were to be sent to the King at Windsor.—"Statesman."

7. Stimulating of Fruit Culture in Orissa :—Recent official advices from Cuttack indicate that one of the many constructive programmes which are engaging the attention of the Minister in charge of Agriculture at present is to give a stimulus to fruit culture on a large scale. For this purpose attention is now being paid to conducting experiments on the culture of mangoes, oranges, litchis and potatoes in the Agency areas such as Koraput, Ganjam and Angul.

8. Tangelo, the Rich Man's Fruit, Acclimatized in India:—Tangelo, which is a cross between the famous "Tange-

rine" orange and grape-fruit and which has been a great commercial success in the U. S. A., has been imported from Florida, U. S. A., and acclimatized to suit local conditions by a leading nurseryman of Calcutta, Messrs. Tangelo Gardens, "Tangelo Grove," G. P. O., Calcutta.

9. The Bombay Canning Fruit Products Co., Ltd., Bombay :—A public limited company, with an issued capital of Rs. three lakhs under the above name, has been recently promoted for the canning of mangoes and other fruits, on a large scale, by V. G. Sapre, Fruit Merchant of Crawford Market, Bombay, and others. Mr. A. K. Karkare of the Biological Laboratory, St. Xavier College, Bombay, has been engaged as Technical Adviser by the above company.

10. Jietee Garden Available for Sale :—S. S. Hukam Singh, it seems, is now retiring from business, while his son, S. Jagjit Singh, has migrated to Nawabshah, Sind, to set up one of the largest modern fruit gardens in India, on contract terms with the Sind Government. Messrs. Jietee Gardens are hence finding it difficult to supervise their garden estate in the Lyallpur District, and have decided to dispose of the same, provided some respectable party is forthcoming to acquire it.

11. "Kisan" Mitchell Fruit Juices :—Thanks to the enterprising spirit of Mitchell Brothers, the "Kisan" Fruit Juices and Squashes of the Indian Mildura Fruit Farm are becoming exceedingly popular in India and abroad. Their total production this year is going to exceed a lakh of bottles as compared

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with about sixty thousand bottles produced last year. We wish them a roaring business in the coming years.

In the absence of Captain L. Mitchell, who is on a continental tour this summer, Mr. R. Mitchell is looking after the vast business of Messrs. Indian Mildura Fruit Farms.

[Our congratulations to Mitchell Brothers on their new spacious "Kisan" premises.—Ed.]

12. Developments in Fruit Section, Agricultural Department, Punjab :—

(a) Assistant Professor of Horticulture:—There had been a persistent demand for arrangements for Post-Graduate training in Horticulture in the Punjab for a long time. It is gratifying to learn that Horticulture is now an important subject not only for the Bachelor of Science Examination in Agriculture but also for the M.Sc. degree of the University of the Punjab. In order to provide the necessary facilities for this line of study the Punjab Government has sanctioned the post of an Assistant Professor of Horticulture, applications for which have been duly invited and the post will very soon be filled.

(b) Post-Graduate Course in Fruit Preservation:—The advanced course in Fruit Preservation of seven months' duration, which was originally to be started on 1st June, 1938, has now been started from 10th July, 1938. Mr. Giridhari Lal Tandon, M.Sc., has been especially engaged as Lecturer for this class under the Fruit Specialist. Mr. Tandon has a great deal of experience of this

industry and is a young man of great enthusiasm.

(c) Unusually heavy admission to short course in Fruit Preservation:—The short courses in Fruit Preservation under the Fruit Specialist, Punjab, are becoming increasingly popular amongst the general public. This season there was provision for 25 students for this course which commenced on the 12th July, 1938, but due to the rush of applications no less than 45 students, including twelve ladies, had to be admitted. Another short course, for ladies only, will be given from August 22, 1938.

(d) Attari Garden:—Out of 25 acres more than 20 acres have been planted with Mangoes, Grape Vines, and Citrus Stock during March 1938. This garden in due course will give some reliable data on the economics of fruit gardening and also serve as a nucleus for field experiments on various aspects of horticulture. Rare fruits have also been allotted a prominent area with a view to determine whether plants like litchis, loquats, almonds, etc., will succeed under the climatic conditions of the central Punjab.

(e) Fruit Garden at Palampur:—The proposal for laying out an experimental garden at Palampur to conduct research on hill fruits is at last being carried out. About 225 renowned varieties of peaches, plums, apricots, almonds, nectarines, prunes, cherries, apples, pears, persimmons, and other hill fruits were procured from Japan, U. S. A., England, Egypt, and some parts of India, for planting in this garden.

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(f) **Proposal for a 50-Acre Date Farm:**—As the income from the Arabian dates is much higher than that from the indigenous varieties, there is a tremendous demand for Arabian date suckers, which cannot be met from the Government date plantation at Muzzafargarh. With a view, therefore, to meet the public demand for date suckers in future the Department of Agriculture is arranging to establish a 50-acre date plantation at Jhang.

(g) **Mango Fruit Shows:**—A Mango Fruit Show for the Eastern Punjab was held at Hoshiarpur on July 14 & 15. Fruit Exhibits of exceptionally good mango varieties from various districts

were on show this year. This was followed closely by the Mango Fruit Show at Karnal from July 16 to 18, 1938, as well as a Mango & Date show at Rajanpur on July 18, 1938.

The District Mango and Date Fruit show, Muzzafargarh, was held on 21 and 22 July, 1938, followed by the Divisional Mango & Date Fruit Show at Multan on 29 and 30 July, 1938.

The inauguration of these Fruit Shows in various parts of the Province indicates the keen interest that is being taken by the Fruit Growers of the Punjab.

K. L. KOHLI, M.A., L.S.G.D.

BELIEVE IT OR NOT

1. PALESTINE with an area only about 1/7th of the Punjab and a population only 5% of the Punjab has about 150,000 acres under fruits. (ii) It exported in 1934 about 3½ crore rupees worth of oranges alone to foreign countries.

2. ITALY, with an area and population of about 20% and 77% respectively more than that of the Punjab, has got 1.38 crore acres under fruits and mixed farms, and the garden produce constituted about Rs. 26 crore alone in 1932.

3. FRANCE with an area and population about 115% and 75% respectively more than that of the Punjab, had total production of wine amounting to 149 crore gallons in 1934.

4. EGYPT with a population of about half that of the Punjab earmarked an annual budget of over fourteen lacs of rupees for the development of its Horticultural Department.

THESE and host of other interesting features make the four Special Bulletins on the respective countries eminently readable and instructive publications.

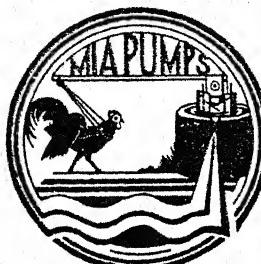
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CHRONICLE OF THE FRUIT WORLD

FOREIGN SECTION

1. Estimated World Production of Oranges:—The 1937 world orange crop was estimated by the Department of Agriculture, U.S.A., at 193 million boxes as compared with the five year average for 1927—31 of 160 million boxes. An increase in production for several years is predicted.

There are now 16 countries with an annual production of over a million boxes of oranges, and the United States leads with an estimated annual production of 55 to 60 million boxes during the next five years. In addition there are ten countries each of which produces between 100,000 and one million boxes of oranges annually. Expressed in carloads, this annual production now stands at 400,000 cars.

2. Government to Rescue of Fruit Industry in U.S.A.:—The Citrus Industry of U.S.A. this year showed signs of over-production and corresponding diminishing returns. To ease the situation the Federal Government of U.S.A. purchased 1450 cars of naval oranges in recent months. Similar large purchases of apples have also been made by the U. S. A. Federal Government. The fruit thus purchased has been distributed widely throughout the country to people on poor relief.

[A laudable example for the Government in India to follow.—Ed.]

3. Government Determined to Push Citrus Industry in Palestine:—There are better things to read about Palestine besides the depressing reports of outlawry in the daily press. In 1928, the area under Citrus was 58,500 dunams (about 14,625 acres), mainly oranges, but by 1937 this had increased to 298,000 dunams (about 74,500 acres), of which 30,000 dunams were planted with grape fruit. Exports of fruits increased from about two million boxes in 1928 to eleven millions in 1937; yet only half the planted area was in bearing last year. Thus in ten years, plantings have increased by over 400 per cent, and exports to an even greater extent. Every possible effort is being made to push the sale of Jaffa Oranges and Grape fruit throughout the world. A special advertisement tax is levied on all Citrus exports of the country, proceeds of which are utilised for the purpose. In 1933 £P6,799 (about Rs. 90,000) was spent in this way, while the figure for 1938 is £P38,664 (about Rs. 5,20,000). Advertising is carried out by means of press, radio and films in most European countries, India and Canada. A new film, featuring the Palestine Citrus Industry, is now being distributed in 17 countries, and it is estimated that 20 million people will see it.

4. New Zealand Government to Control Citrus Imports:—All Citrus Imports to New Zealand will be under

Government control from May 1, 1938. Further details are lacking.

5. Mussolini and Hitler as Fruit Eaters :—Mussolini, absolute ruler over 42,500,000 Italians and 7,600,000 Ethiopians, extensively uses fruit in his diet. At 1 o'clock he has salad and fruit, occasionally a little fish or boiled meat and milk. He dines late at nine on fruit and milk.

Hitler's Meatless Days :—Hitler's great food is grapes. Not a day passes that he is not served with at least one bunch of these. He also extensively uses fruit juices and vegetables. No meat enters his diet, and he never touches distilled drinks, almost never wine and seldom smokes a cigarette.

6. Bad Year for British Fruit Growers : April reports indicate that farmers and fruit-growers in Great Britain are having a bad time with drought, frost and cold winds. Reports of extensive damage come from almost all leading orchards of the country. A bad season for fruits has hit hard the newly growing canning industry as well.

7. Plant Importation Rules, 1938, in North Borneo :—The Government of North Borneo has introduced a number of rules and regulations for the import of plants purporting :—

(i) That no person shall import any plant except at Ports of Sandakan or Jessalton, and except with the previous permission of the Department of Agriculture of the said State, and that all such imports are to be accompanied by the certificate of a competent officer of the exporting country to the effect that

the plant is free from pest and disease or that it has been fumigated.

(ii) Further that all such imports are to be made care of the Department of Agriculture, North Borneo, with powers for thorough examination, quarantining, or any other process deemed necessary before delivering the imported consignments to the consignee.

8. Crash in the North-West U. S. A. Apple Trade :—April reports indicate that during this season apple business was the dullest ever witnessed in recent years. In January, 1938, terminal market prices were so ridiculously low that many wholesalers even refused to accept supplies on consignment or commission, because their very low values rendered the customary 5 to 10 per cent commission inadequate to offset the expenses of handling. Various reasons were attributed for this, unusual depression, over production and lack of co-ordination of business interests being the major ones.

9. North-West U. S. A. Apple-growers Determined to fight Depression :—The disastrous marketing season of 1937-38 has prompted the United Tree Fruits Movement in the Wenatchee-Okanogan Fruit Districts of U. S. A. Thousands of apple-growers of these districts have already joined the United Tree Fruits Movement. This is an earnest attempt to unify their industry into a single acting unit. This plan contemplates a set of inter-locking contracts between the grower, the marketer, the warehouser and the packer. Mem-

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bership is designated by signing the member's contract under which the signatory agrees to permit his apples to be marketed by the association through an affiliated group of "accredited marketers," who in turn must qualify with the association by contract to market at least 500 cars of fruit annually. Each marketer must market members' fruit only. The warehousemen also contract with the association as to local charges, as well as agreeing to warehouse only association fruit. The financing agencies are also involved to the extent that they request their borrowers to sign a marketing contract with the association. The promoters of the movement are keen to move the fruit to the markets as fast as possible, without complete sacrifice of values. Unnecessary storage of fruits will be discouraged. Recent advices indicate that the movement has excellent prospects of attaining the 80 per cent sign up, many communities have signed "en masse," and several thousand cars of the 1938 crop have already been pledged.

10. Magnitude of Citrus Industry of U. S. A.:—Some very telling figures about the Citrus Industry of U. S. A., were presented by the leaders of the California Citrus Industry while presenting the case of this industry against the Rail-road's application for increased rates:—

Acreage:—The following are the latest figures for citrus acreage of the important citrus-producing States in U. S. A.

State	Bearing	Non-bearing	Total
California	272,748	46,830	319,279
Arizona	15,997	5,166	21,163
Florida	308,392	42,448	350,840
Texas	86,266	28,459	114,725

Annual Shipments of different States:—

State	Season 1935-36	Season (Car loads)	Season 1936-37 (Car loads)
Florida	..	50,693	65,106
California-Arizona		83,861	59,765
Texas	..	5,038	18,032

The annual amount of capital invested in the citrus industry is estimated at 630,000,000 dollars (about Rs. 1,890,000,000). The number of people dependent on the Industry was given as 200,000.

11. Florida's Annual Citrus Advertising Budget:—In 1937 Florida (U. S. A.) by way of promotion of sales of its citrus fruits spent 511,000 dollars (about Rs. 1,533,000) on advertisements.

12. Apple Bread:—Mr. Werner Iller, proprietor of the Golden Loaf Bakery, Wenatchee, Wash., has developed a process to convert apples into a form whereby they may be put into bread in large enough quantities to improve the product, but still keep it as light and fluffy as white bread. It is claimed that 20% apples are used. The apples are processed and the bread is never heavy or soggy. Mr. Iller has named his product APPEal Bread and says that it contains the same food value

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as regular bread together with the vitamins and other properties of apples. The brand is copy-righted and you are guaranteed the full amount of apples that it is possible to use in making the bread.

12. High Vitamin C Value in Apples :—The question, how many apples a day keep the doctor away, has been answered by Dr. E. N. Todhunter, Associate Professor of Nutrition, State College of Washington. In a recent nutritive bulletin she sums up her reply as under :—

To protect a man from scurvy 15 milligrams of pure vitamin C are required per day. That amount is supplied by the following numbers of fresh apples of the following varieties: Jonathan 6, Golden Delicious 3, Richards 5, Winesap 2, Rome Beauty 2, Spitzenberg 2, Yellow Newton 2.5, and Delicious 5.

After storage for six months at 45 degrees F., it requires one more Delicious apple to supply the necessary amount of the vitamin, but the number of stored Richards apples remains the same as for fresh ones. After peeling, it requires six instead of three Golden Delicious apples since a high percentage of the vitamin is found in the peel of this variety.

13. A New Source of Citric Acid :—Every war gives a great fillip to Scientific research and the recent Italo-Abyssinian War is no exception. Italy had almost a monopoly of Citric Acid production which was manufactured from Citrus fruits, chiefly lemons, so abundant in Italy. On account of the

need for this fruit, consequent on the Abyssinian War, Italy put an embargo on the export of lemons. Thus, the chief source of the manufacture of Citric Acid was virtually cut off. Restriction of this nature stimulated researches, as a result of which it was found that the black mould forming on fruits is capable of converting sugar into Citric Acid. The black mould grows well on sugar and, during the process of fermentation, Citric Acid is formed. The services of the black mould were thus requisitioned for the manufacture of Citric Acid on a commercial scale, and it was found that the cost of production by this process was considerably lower than the manufacture of the acid from lemons.—“Capital.”

14. New Control for Orchard Mice:—A rodent control specialist in the U.S.A. Department of Agriculture is now recommending a poison called Rodenticide for controlling field mice in orchards. This is used with freshly cut apple bait, which should be exposed directly in the mouse trails found under the cover of mulch, old sacks and slabs of wood or in burrows that enter the ground. As mice are known to be most active between 11 A.M. and 4 P.M., it is wise to put the bait in place early in the morning.

15. Remedy for Black Rot Disease of Cabbage :—Infected seed may be dipped in mercuric chloride solution (one part mercuric chloride in 1,000 parts of water) for 20 minutes.

K. L. KOHLI, M.A., L.S.G.D.

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RADIO TALK ON FRUIT PRESERVATION

—By—

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(Calif.), Fruit Specialist, Punjab,
Lyallpur.

I propose to discuss to-night the scope of the fruit preservation industry in the Punjab. But before doing so, it seems necessary for me to discuss briefly the importance of fruit preservation in the development of fruit farming and also to give an idea to my listeners about the extent of this industry in foreign countries. I consider it necessary to do so because to most Indians the conception of fruit preservation is nothing more than the preparation of 'chutney' and 'murabas' and it is imperative to bring my listeners to the realization of the fact that this industry, which was almost unknown in the Punjab until a few years back, has reached a very advanced stage in other countries of the world.

Apart from 'chutnies' and 'murabas' (pickles and preserves) which no doubt have been prepared for centuries in almost every country including India, food preservation is comparatively a modern art. In fact it was during the Napoleonic wars that the French Government offered a handsome prize for the most practical method of preserving food for the troops at the front. This stimulated many to start research work in France. English scientists also did not lag behind. It was, however, in the middle of the 19th century that the epoch-making researches of Pasteur

demonstrated to the world the real cause of fermentation and other changes in food stuffs. To the scientific side of this subject, however, I need not refer in this short talk.

Although the U. S. A. started this industry later than France and England it has now out-stripped all other countries in the manufacture and export of preserved fruits, vegetables and other food stuffs. I do not happen to have with me just now the latest figures but in 1927, U. S. A. canned about one billion dollars or about 300 crore rupees worth of food stuff. In California alone which is one of the 48 States of America and which has only about 1/5th the population of the Punjab, the total amount of canned fruits alone in 1927-28 reached the staggering figure of over 2 crore boxes or about 48 crore cans, worth over 50 million dollars or about 15 crore of rupees, about half of which were exported from the State. In that very year about 1½ crore mds. of fruits were dried. This is exclusive of vegetable canning which is equally important there. A chain of large factories exist, several of them with a capacity of turning out about one million cans a day. In my talk on the 23rd February I casually referred to the pine-apple canning industry of the Hawaiian islands lying between California and Japan and which

I had the opportunity of seeing in 1922. This small group of islands started pine apple growing in 1900 and within a short period of 20 years or so, the amount of pine apple canned rose to 60 lacs of boxes, worth several crores of rupees. Other countries of the world are also making rapid strides in this industry while we in India are yet educating the people to the possibilities of this industry here.

Fruit Preservation indispensable to the development of fruit farming.

It must not be forgotten that fruit preservation is absolutely indispensable to the development of fruit farming. No country can expect to develop its fruit industry on sound lines without developing fruit preservation side by side because in every garden, no matter how nicely it is managed, there is bound to be a certain percentage of fruit varying from 10 to 25% or even more which is not really worth selling in the fresh fruit market but which, nevertheless, is quite suitable for the manufacture of various fruit by-products. The usual practice in other countries of the world is, to sell in the local or foreign market only first class fresh fruit of standard quality and utilise some of it for canning or bottling also. All the remaining fruit of inferior quality is used for other products like jams, jellies, marmalades, juices, citric acid, vinegar, pectin, essential oil etc. What impressed me most during my extensive tours in foreign countries was that practically no portion of the fruit is allowed to go to waste. For instance, in the process of making jams and jellies from apples, a great amount

of residue, in the form of peels and cores, accumulates in the factory which is not, however, wasted but is crushed and the juice extracted from it used for making vinegar or alcohol. In Italy and Sicily island, I observed that not only lemons are used for the manufacture of lemon squash and citric acid, but essential oil is first extracted from the peels which are then utilized for the purpose of pickling or for the extraction of pectin and the final residue is used as animal feed or as fertiliser. Even the small amount of alcohol which becomes available is also reclaimed. As a contrast, the practice in our country, unfortunately, is to mix inferior fruit with good fruit or allow it to go to waste as there are no facilities for utilising it for any other purpose.

Fruit farming can be profitable and can maintain a continued progress only if first class fresh fruit is placed on the market, whether local or foreign, and inferior fruit is utilised for various by-products in a manner which would fetch a decent income to the grower. In the Punjab a large amount of inferior fruit at present goes to waste. In the mango growing tracts of Hoshiarpur, Gurdaspur, etc., mango fruit in some years does not fetch even Rs. -[4]- a maund. Thousands of maunds merely rot on the ground because it does not pay even to pick or cart the fruit. This fruit, although of poor quality, should nevertheless be utilised for the manufacture of some by-product if regular research is carried out in this line. Similarly in date growing tracts, due to untimely rain in some years, a good deal of the fruit goes to

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waste which can be used for products like vinegar, or alcohol. In the Kullu valley, owing to transport difficulties, sometimes even excellent pears do not fetch Rs. -[8]- a maund. Due to Cholera in some years, the entry of certain fruits is prohibited in a town with the result that a large amount of easily perishable fruit goes to waste in the garden. Sometimes fruit of even good quality does not fetch a reasonable price because of a temporary glut in the market. In our Province it is not uncommon to see that some fruits, which sell very cheap in season of plenty, cannot be had even at 5 times the price after a month or two. Tomatoes in certain months do not fetch even Rs. -[12]- a md. but after two or three months they cannot be had even at Rs. 5/- a md. All this trouble can be overcome with the introduction of fruit and vegetable preservation. This industry, if properly developed, can take care of surplus or unsaleable fruit in seasons of plenty and make the same available in seasons of scarcity to the mutual benefit of grower and consumer. This is the reason why national Governments of all countries in the world not only encourage fruit and vegetable preservation as a national industry, but popularise it as a subject of domestic economy. Even the students in the high schools are taught how to preserve their surplus fruits and vegetables in season of plenty for use in season of scarcity and to manufacture various kinds of fruit products on a small scale for home consumption. Fruit preservation forms an integral part of the course of domestic science in all the schools.

Fruit Products for which there is a scope in the Punjab :—Let me now discuss for what products there is scope in the Punjab. The greatest scope lies in the manufacture of fruit juices. India is a tropical country and the need for cold drinks is felt for a greater part of the year. Even in the Punjab we require cold drinks for at least 8 months in the year and in many other provinces of India cold drinks are needed practically all the year round. If the figures of the amount of aerated waters like orangeade, lemonade, strawberry, etc., as well as various kinds of 'sherbats' and beverages consumed are collected for the whole country they will easily amount to several hundred crores of bottles. Most of these contain artificial colour, flavour and saccharine instead of sugar, none of which has any food value. If real fruit juices could be substituted in place of these synthetic preparations, it should prove, on the one hand, a boon to the consumer and on the other, prosperity to the fruit grower and would also stop a drain of money from India as most of the synthetic products are imported from abroad. There is not the slightest justification for importing orange and lemon squashes or other fruit juices from foreign countries when we have any amount of fruit available here and the same can be manufactured at a portion of the cost at which the imported products are sold. It is, of course, gratifying to see that whereas some years back hardly any squash was produced locally, at present several lacs of bottles of excellent squashes are prepared in the Punjab under sanitary conditions and from excellent fruits. There is every reason to

hope that during the next ten years or so the Punjab should manufacture 30 to 40 lacs of bottles of squashes of various kinds every year. This is not an excessive estimate especially if the quality of the products shows constant improvement, cost of production goes down and our people show greater patriotism in patronizing Indian products of standard quality.

Other products for which there appears to be a great scope are tomato juice, tomato ketchup, jams and jellies, vinegar, crystallised or candied fruit or canning of vegetables like peas, green grams, etc. Medical authorities all over the world are recommending the use of tomato juice both for patients and healthy people, whether children or grown up. A bottle 24 oz. in size is sold in India for about Rs. 1|4|- which can be actually manufactured in India at a cost of a few annas only. It seems almost an insult to our intelligence that we should be importing tomato juice from outside while our own tomatoes are rotting here in tons and do not fetch, at certain seasons, even Rs. -|12|- a md. Green peas or green gram can be had at certain seasons for one or two pice a seer which, if properly canned or bottled, should prove a boon at a time when fresh peas are sold in the market at Rs. -|12|- a seer. Most of our common fruits like peaches, plums, guavas, apricots, etc., that are of poor quality are very cheap at the time of ripening and they are quite suitable for the purpose of jams, jellies, etc., and the products made can, therefore, favourably compete

with imported ones both in quality and price. Crystallised or candied fruits are also imported into India in considerable quantities. Their preparation is not very difficult and there is no justification for not manufacturing the same in our country. A great deal of the fruit that goes to waste at present can be utilised in making vinegar. The cost of making vinegar from some of the fruits does not come to even an anna or so per bottle while we are importing immense quantities of vinegar from abroad at a high price.

There is a great cry of unemployment at present. Development of fruit culture and fruit preservation would not only solve the problem of unemployment to a considerable extent but it would also solve the equally important problem of the low standard of living. It is only by popularising this domestic science of fruit and vegetable preservation that we can expect to raise the standard of living without raising the cost of living and enable people of moderate income to make both ends meet. By introducing this course in our girls' schools we can teach the would-be wives and mothers how to make their own squashes, juices, jams and pickles or to preserve peas and green grams in season of plenty at a trifling cost for use in season of scarcity. The Fruit Section of the Punjab Agricultural Department offers every year a number of courses to impart training both for home use and commercial purpose.

PROTECTION OF FRUIT TREES FROM SUN-BURN

—By—

B A L S I N G H B A J W A ,

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Most fruit growers are familiar with the injury caused by severe cold or frost to fruit trees, but they are unaware, that fruit trees can also be injured by the incidence of sun rays on the parts directly exposed to the sun. The injury thus caused is popularly termed as sun-burn, sun-scald or sun-stroke. There is hardly any garden which is entirely free from this trouble and it would be extremely desirable for fruit growers to pay attention to the facts brought to their notice in this talk.

When any portion of the trunk or stem of the tree is exposed to the rays of the sun, the bark, on account of the local high temperature, is so severely injured that it dries up and separates in the form of strips. Sometimes the bark, in patches, is so greatly affected that decay accompanied by 'gumming' sets in. 'Gumming' is also the result of some other fungus bark diseases but is mostly due to sun-burn. Such injuries on the stems of trees cause a serious set back in their growth. In severe cases trees have completely dried up in the course of a few months. Sun-injury occurs on the side most exposed to the direct rays of the sun. The south and south-western side gets the sun directly and hence the stem or trunk is mostly sun-burnt on this side.

But if the stem is shaded by branches even on this side, then this injury is less liable to occur. Injury from sun-burn can also occur in the central portion of the tree if that part is exposed to the sun directly, either through injudicious pruning or cutting away or breakage of a limb.

Not only are the exposed stems and trunks of trees affected but the fruits are also damaged considerably if these are exposed to the direct rays of the sun. This damage is most frequently noticed in sangra and malta orchards, particularly those situated in the canal colonies or south western districts like Multan, Muzaffargarh, etc., where the heat of the sun is more intense and temperature is higher than in most other citrus growing tracts of the Province. Sun-burnt fruits show brown dried up patches on the rind or skin which adheres tightly to the pulp at these spots. The affected side of the fruit either stops growth altogether or grows rather slowly, while the uninjured portion of the fruit makes normal growth, which results in deformed fruits. Such fruits are ugly to look at and their market price is greatly lowered as most of the fruit dealers, due to their ignorance, mistake these fruits for diseased fruits. Although the pulp of the fruit directly

underneath the sun-burnt portion is somewhat dry and devoid of juice, the fruit on the whole is quite sound for human consumption. In this case also the injury is most pronounced on exposed trees and more so on the fruits borne on the south-western side of the tree. The damage on the individual fruits is also confined to the side exposed to the south-west. In order to find out the exact losses, occurring in case of fruits from sun-burn, observations were made in the experimental garden at Lyallpur and the results bear out the main points already discussed. Fourteen trees of sangtra oranges were selected for the purpose of keeping records in the year 1937. Six of these trees stood in the open and were the fairly exposed to the sun. The remaining 8 trees were partially protected by "Jantar" (*Sesbania Egyptica*) hedge running north-east to south-west. The hedge was originally planted for another purpose, but incidentally afforded some protection to these trees. The total number of fruits as well as the number affected by the sun on all these trees was counted. The number of fruits on each side, viz., north-east, south-east, south-west and north-west, as well as the number of affected fruits on these sides was counted separately. In the case of six exposed sangtra trees, out of 1878 fruits 422 were affected by sun-burn, thus giving 22.5% damaged fruits on the whole, while in the case of 8 partially protected trees out of 2035 fruits, 263 were affected by sun-burn, giving only 12.9% damaged fruits. This shows that "Jantar" hedge by affording partial protection decreased the total injury by 50%. It was also

concluded that if the hedge ran north-west to south-east it would be possible to decrease the injury still further as it would afford protection on the south-west side where the damage is the highest.

The results obtained of the amount of damage on the various aspects, both in exposed and partially protected trees, are also very convincing. In case of exposed trees the percentage of damage on various sides was; on north-east 10%; on south-east 15.4%; on south-west 41.0% and on north-west 23.3%, showing that the greatest damage occurred on the south-western side.

Factors Influencing Sun-burn.

1. Injury from sun-burn occurs more in the summer months than in winter months.

2. Although trees of any age may be injured by sun-burn if any part of the stem or limbs is exposed to the direct sun-rays, yet it has been the common experience that newly planted young trees, weak trees or trees suffering from drought are much more liable to injury from sun-burn. Mortality in newly planted but unprotected young trees is especially high.

3. Plants budded or grafted too high, when planted, suffer more from sun-burn than plants budded or grafted at proper height, as more of the stem of the plants in the former case is exposed to the sun rays.

4. Tall trees are more liable to injury than low headed trees. The bare stems of tall trees have a higher temperature than stems of low headed

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trees which are not so much exposed to the sun.

5. Trees with smooth bark are more easily injured by sun-burn than trees with rough bark.

6. Plants obtained from cold regions when planted in comparatively hot sections suffer more from sun-burn than plants produced locally.

Remedies: In order to decrease the losses from sun-burn, it is necessary to take certain precautions. The following recommendations, if carried out carefully, will prove very effective.

1. The exposed stems of newly planted trees should be protected by wrapping the same with some kind of straw. Wheat and Toria straw, maize and Jowar stalks or 'sarkanda' can serve the purpose and are easily available in villages. When newly developed branches afford shade to the trunk, the use of these wrappers may be discontinued.

2. By proper pruning and training, more growth should be encouraged on the south-west side so that this may afford protection to the trunk. Also try to develop low headed trees by judicious pruning and properly heading or cutting back the plants at the time of planting.

3. For the protection of fruits from sun-burn, keep the centre of the trees fairly thinned by proper pruning and thus encourage the production of fruit towards the inner side. This fruit is finer in appearance. For the protection of fruit borne on the outer side, "Jantar"

hedge should be planted running from north-west to south-east fairly close to the trees. This will reduce the injury from the sun to a great extent.

4. Probably the best and the easiest plan to protect young and old trees from sun-burn is to white wash the stem of the tree. This white wash can be prepared by adding 20 srs. of quick lime to $1\frac{1}{2}$ mds. of hot water and slaking it thoroughly. Dilute the mixture by adding cold water so that the white wash flows well. This may then be applied with a brush on the exposed part of the stem. As the white wash is easily washed off by rain, it may be applied as often as necessary throughout the year.

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CITRUS TREE SHAPE AND PRODUCTION

—By—

Dr. SHAM SINGH, Ph.D. (Bristol),

Assistant Horticulturist, Lyallpur.

The citrus trees commonly met with in the Punjab are low-headed and spherical in shape; that is to say the branching begins within one foot of the ground level and the central leader with its umbrella-like top shades the bearing branches below. Yearly new growth takes place on the exposed tips of branches without any growth taking place in the interior. In fact the inside branches dry out in large numbers and have to be removed annually. Whatever crop is borne on the trees is literally confined to the periphery and here the fruit is very well exposed to the damage by direct sun. The fruit borne on the low hanging branches may be injured through coming in contact with the ground. The out-turns in India are, on the average, low in comparison with some other countries and the decline in the annual out-turn sets in comparatively much earlier. No kind of soil or fertilizer practice can help to retrieve the situation once brought about through neglect in early years.

The solution of the problem appears to lie in (a) judicious training of the tree in early years, thus providing a frame-work which is not only mechanically strong but is of the desired form and size and (b) reconstructing mature trees of undesirable form. The follow-

ing suggestions may, if properly attended to, considerably help to solve the difficulties.

Training of Young Citrus Trees

(1) Citrus trees, like other fruit trees, should be trained during their early years. Unlike many deciduous plants that make a whip-like growth in the nursery, the citrus plants have a strong tendency to branch out at a very early age. The training of citrus plants, therefore, begins in their nursery stage. For the first few weeks the growing budded shoots are supported by tying them on to the stubs of the seedling stocks left there for the purpose. Later on each and every budded plant should be provided with a stake and care should be taken that the budded shoots grow straight without branching at least upto a height of 2—2½ feet and thereafter the development of the head should begin. The citrus nursery plants thus trained should produce a whip-like growth, like deciduous plants, with or without the formation of head.

(2) After planting in the garden, the whip-like tree should be headed back at about 30 inches and immediately white-washed to protect against sunburn. When the young shoots have grown about 4-6 inches long, 3-5 of

them should be selected as main scaffold branches and well distributed up, down and around the trunk. Very low heading in the case of citrus is inadvisable because the pendulous habit results in a good portion of the fruit being spoiled when coming in contact with the ground. A head higher than 36 inches may, on the other hand, cause wind injury or sunburn.

(3) Next, the only pruning that should be done is to thin out unwanted shoots and to remove any that are not suitably situated. This should be done every 2 to 3 months in the growing season.

(4) Diseased, injured, crossing or interfering branches should be removed. In cutting care should always be taken to cut the branches back to such laterals as are desired to grow for shaping the tree.

(5) No crop should be taken for the first 3 years, as early production results in loss of vigour and mal-development of the tree.

Reconstruction of Mature Citrus Trees

The objects aimed at are to admit proper amount of sunlight, opening for aeration and retention of a minimum number of frame limbs to secure equilibrium. The following operations should be attended to in order to achieve these objects :—

(1) A careful preliminary analysis of the tree structure should be made before launching on reconstruction.

(2) The central leader should be removed in order to open the interior with a view to admit more air and sunlight for the growth of the fruit and the internal branches. Growth in the interior, therefore, need not be removed.

(3) The severe cutting back of the outer limbs is to be deprecated. The removal of low hanging branches can be done by under-cutting to a lateral, growing horizontally or vertically, so that no stubs remain. These stubs, if allowed to remain usually die and serve as a source of infection.

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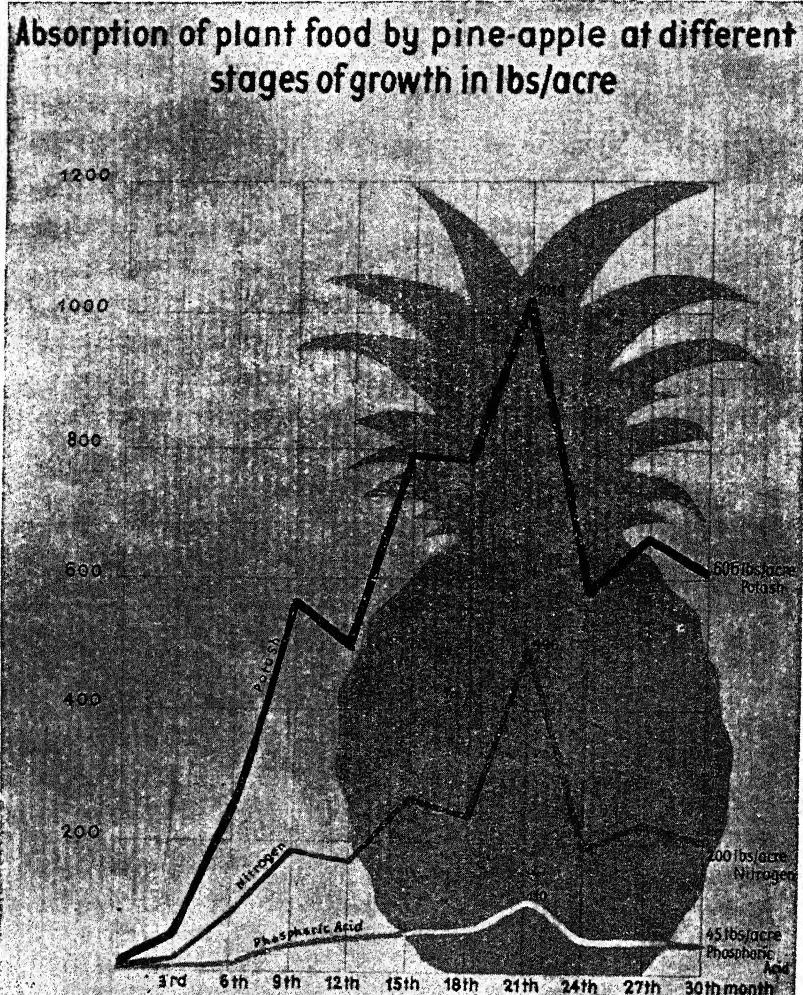
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While applying please mention the Punjab Fruit Journal

USES OF KAGHZI LIME (KAGHZI NIMBOO)

—By—

GURDIAL SINGH KAHLON, B.Sc.,

(Agri.), Jagadhari.

Lemons are a very useful fruit, and here are some of the uses to which they can be put.

In Cookery: When boiling rice or potatoes if a little rind of lemon be added it improves the colour of rice and potatoes and rice grains will be firmer.

Lemon juice added to rich food will counter-act the richness and make the food more digestible. Added to fish when boiled it keeps it whole and preserves the flavour. A few drops of lemon juice added to water when poaching eggs keeps them from separating.

In Sickness: Lemons are excellent for many ailments. For gout and rheumatism four to six ounces of fresh lemon juice should be taken daily. For sluggish liver take the juice of a lemon in water. Headaches and neuralgia are relieved by rubbing a slice of lemon on the forehead or by taking a cup of strong coffee with a teaspoonful of lemon juice added. A gargle of sweetened lemon juice is good for sore throat. A lemon taken first thing in the morning in a glass of water, hot or cold, is a remedy for indigestion, spots and complexion troubles. If a fish-bone sticks in the throat, suck a lemon, the bone is dissolved. Lemon juice allays itch.

For Bleaching: Cut a lemon in slices and put them in a muslin bag in a boiler with the articles required to be bleached. They will emerge beautifully white and fresh looking.

For Cleansing: Lemon juice removes vegetable and fruit stains from the hands. They whiten hands and nails. Lemons quickly clean brass or silver ware. They remove stains from marble and ivory. They whiten piano or harmonium keys. A piece of lemon will remove marks from white paint without removing the paint.

For Toilet: As a mouthwash lemon juice is splendid. It cleanses and disinfects the mouth and whitens the teeth if used with a toothbrush. It dissolves tartar and keeps the gums in good condition.

As an astringent for the face, arms and neck lemon juice is marvellous and better than many expensive lotions. Mix it with equal parts of glycerine, rose water and eue-de-cologne.

As a shampoo for greasy hair try lemon juice in the rinsing water. It makes the hair fluffy, soft and glossy. If you want nice soft water for a wash you may put the chopped skin of a lemon into water and keep over night.

HEALTH VALUE OF APPLE JUICE

(They Are Naturally Laxative and More Clearly Adjusted to Body Than Other Fruits)

—By—

SLANLEY LIEF, N.D., D.O., D.C.

I often recommend fruit juice, such as that of oranges, tomatoes, pineapples, grapes, or grape fruit, as beneficial additions to the Diet Reform regimen. There are many reasons why all of these are excellent, but I am anxious to pass on my experience with unfermented apple-juice, a juice which is not so popular as some of the others mentioned.

It is undoubtedly a fact that, of all the fruits Nature provides so abundantly, the apple is probably the best known and the most popular, both on account of its flavour and the ease with which it can be obtained. Its qualities as a food, however, are not known sufficiently. Containing potash, soda, magnesia, and phosphorus, the apple is most valuable to the nutritional requirements of the human system. The acid it contains is chiefly that known as malic acid and it is readily utilized by the body.

Dietetic Value

Recent observations in feeding experiments seem to indicate that its protein, though small in amount, is particularly fine in quality. Possessing anti-septic, germicidal and alkaline qualities, no fruit can be compared with the apple in its dietetic value. Apples are natur-

ally laxative, and the proportions of their composition are more clearly adjusted to the human constitution than any other single fruit.

For the last few months I have been experimenting with the use of apple-juice in the treatment of the sick I have found very good results ensue from fasting patients exclusively on apple-juice and water. A glassful, taken every three hours while on a fast, has a very stimulating and bracing effect on the fasting patient. I have found that the juice has, generally, a mild laxative effect, which is to be noticed even when no other food is taken.

Superior Effect

In relation to the effect of the juice on the bowels it can be said that the juice, taken on an empty stomach may be considered as a most effective measure and even superior to the whole fruit in its effect. The reason for this is that the fruit-juice, the constituents of which require no chemical digestion, is very quickly dispatched by the empty stomach to the upper part of the bowels. The weak acids and fruit sugars, when rapidly introduced in considerable quantities, produce undulating motions, of the upper bowel (peristalsis), which

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are continued in the lower part of the bowel; whereas the whole fruit, raw or cooked, produces much less effect, the matter remaining longer in the stomach and the upper part of the bowel receiving it only gradually. The sudden and stimulating effect is thus absent.

As a Laxative

For its laxative effects alone it can be recommended for both adults and children.

Its anti-uric-acid quality is also a great recommendation. In rheumatism, gout, and other similar complaints, when some difficulty is experienced in assimilating the more acid fruit-juices such as orange, grape fruit, lemon, etc., the juice of the apple can be specially recommended.

When on an ordinary diet a glass of apple-juice taken the first thing in the morning, before retiring at night, and when desired between meals, is a very valuable dietetic measure from every point of view.

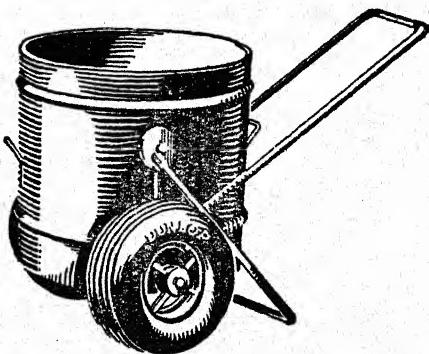
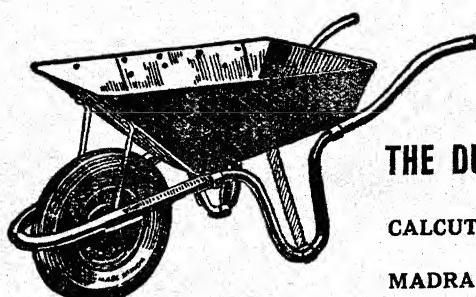
Children like apple-juice very much, and it is not out of the way to suggest that it could be used by school children at the lunch-hour in place of milk, sandwiches, etc., which foods are hard to digest and remain in the stomach to interfere with the next meal.

For those who have not had any experience of this drink I can thoroughly recommend it, not only as beneficial from the health standpoint but also from the point of view of its truly delicious flavour.—"Health for all."

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A NOTE ON THE KULU VALLEY FRUIT INDUSTRY

—By—

R. S. CHUNI LAL,

Peace Cottage, Manali, Kulu.

The Fruit Industry in the Kulu Valley, with one exception, is at present carried on, on retail basis. In the past the fruit from the valley was exported by parcel post, but for the last several years, owing to a very considerable increase in rates of post parcels by the Postal Department, the fruits are generally exported by Railway parcels and very rarely by post. When the production of fruit increases in the valley fruit growers will not be able to dispose of their fruit on retail basis and shall have to adopt whole-sale basis for which they shall have to depend on the proposed fruit marketing scheme of the Punjab Fruit Development Board when it comes into operation and is fully developed, just as the banking system has developed by opening branches in important commercial centres in the Punjab and outside. In the meantime the fruit growers in the valley are handicapped in the disposal of their fruit profitably, on account of the road from Mandi to

Ghatta being under the control of the Mandi State. The feasibility of opening other roads such as the one from Baij Nath to Katrain by opening a tunnel through the Bhaboo Pass and the other a road through Mandi, Suket, Balaspur and Rupar has been considered by the P.W.D. Engineers but have been rejected as impracticable, the former on account of financial difficulties and in the case of latter, in addition to financial difficulties, on account of its passing through the territories of more than one Indian State. The widening of the mule traffic roads from Larji to Simla and from Darang, over the Dulchi Pass to Bijaura have also been rejected for similar reasons. The only practical course left for further development of fruit industry in the valley is the taking over by the Punjab Government of the road from Mandi to Ghatta under its own control and to mettle and widen it for both way traffic.

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PREPARATION OF LEMON-BARLEY WATER

—By—

GIRDHARI LAL TANDON, M.Sc.,

Fruit Section, Lyallpur.

The introduction of Lemon-Barley water in the Indian market is of recent origin. The name suggests that it is a mixture of lemon juice and barley water. As regards its nutritive properties lemon-barley water is well-known for its cooling properties and is recommended by doctors for fevers, cholera and for expectant and nursing mothers. The main feature in the manufacture of this beverage is the preparation of the barley extract. Lemon juice and sugar are merely added for taste. The secret of obtaining a good barley extract lies in preserving the complete nutritive value of the barley which should be got into the solution with the application of least possible heat in the shortest possible time.

On boiling barley a mucilagenous or gummy material forms a homogenous solution with the water. This mucilagenous material or glutin is the real nutritive portion of the barley in solution. In case heat is applied for any length of time this substance is destroyed.

For the purpose of making barley extract, instead of whole barley, powdered barley, such as Robinson's patent barley, is recommended. The extract should be taken as follows :—

STEP I.—Mix about eight grammes of powdered Barley with water. Make into a smooth paste and make the volume one pint by adding water. Keep stirring all the time.

STEP II.—Allow it to simmer for five to ten minutes in a sauce-pan.

STEP III.—Cool and filter through a muslin cloth.

STEP IV.—Add lemon juice, sugar, essences, etc., according to taste, or according to the formula given below :—

Lemon Juice—11.3 gallons. (113 lbs.).

Sugar—128 lbs

Essence of Lemon—40 ounces.

Barley extract of 4 lbs of barley and make up to 37 gallons with water.

A smooth refined flavour is essential as any harshness or undue acidity overpowers the rich delicate aroma of the Barley.

Preservation

Add one ounce of Pot. meta bisulphite per 10 gallons of lemon-barley water or sulphur dioxide amounting to 350 parts per million. Higher quantities impart a flavour to the product.

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THE USE OF ARTIFICIAL FRUIT FLAVOURS IN THE FRUIT
PRESERVATION INDUSTRY

—By—

Lieut P. MAYADAS, B.Sc., (Agri.),

Fruit Section, Lyallpur.

The problem of preserving natural fruit flavour in fruit beverages and other preserved fruit products has never engaged the attention of fruit preservation experts more than in recent years. Various methods have been tried with a certain amount of success. The delicate flavours of fruits such as strawberry, loganberry, raspberry, pineapple, fresh grapes, etc., have been preserved by concentrating the fruit juices under vacuum or by centrifuging after freezing and finally flash pasteurizing the product. These methods, however, are fairly technical and require elaborate machinery and delicate handling.

The most easily preserved natural fruit flavour is that of citrus fruits, but even this requires the addition of peel oil or an emulsion of the peel itself. This practice also has certain drawbacks, an important one being that the product leaves a tinge of burning bitterness as an after-taste.

Artificial fruit flavours have been extensively used in the past and are even now very much in use especially in aerated waters. Apart from the fact that aerated waters are almost nil in nutritive value we cannot deny that the refreshing qualities in such drinks are due

to nothing but the delicious flavours imparted by synthetic fruit essences.

These essences are cheaply prepared and easy to use but the general tendency is to use them too freely and in extra strong doses. Artificial flavours should be very judiciously used and just that amount added which would impart a delicate refreshing aroma to the product; harshness in the flavour should be avoided.

A few important standardised recipes for making artificial fruit flavours are reproduced below from the "Industry" of July, 1938 which may be tried by readers interested in the subject.

ARTIFICIAL FRUIT FLAVOURS

Banana

Amyl acetate	..	300	parts
Amyl butyrate	..	100	"
Benzaldehyde	..	15	"
Benzyl propionate	..	40	"
Ethyl butyrate	..	400	"
Ethyl sebacate	..	100	"
Clove oil	..	20	"
Petitgrain oil	..	20	"
Vanillin	..	5	"
Mix			

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Grape		Strawberry	
Acetaldehyde	.. 50 parts	Ethyl oenanthate	.. 50 parts
Amyl butyrate	.. 50 "	Ethyl nitrite	.. 30 "
Chloroform	.. 50 "	Acetaldehyde	.. 70 "
Clary sage	.. 10 "	Methyl salicylate	.. 10 "
Ethyl acetate	.. 400 "	Ionone alpha	.. 20 "
Ethyl oenanthate	.. 200 "	Succinic acid	.. 50 "
Ethyl pelargonate	.. 30 "	Gamma nonyl lactone	30 "
Ethyl formate	.. 50 "	Vanillin	.. 20 "
Methyl salicylate	.. 10 "	Mix.	
Succinic acid	.. 30 "		
Cognac oil	.. 10 "		
Octyl valerenate	.. 5 "	Ethyl methyl-phenylglycidate	.. 100 parts
Vanillin	.. 5 "	Ethyl acetate	.. 300 "
Glycerine	.. 100 "	Ethyl benzoate	.. 30 "
Mix.		Ethyl butyrate	.. 200 "
		Ethyl nitrite	.. 100 "
		Ethyl pelargonate	.. 50 "
		Ethyl formate	.. 100 "
		Amyl acetate	.. 40 "
		Benzyl acetone	.. 30 "
		Methyl naphthyl-ketone	.. 10 "
		Methyl salicylate	.. 20 "
		Cinnamon oil	.. 10 "
		Coumarin	.. 10 "
		Mix.	
Pineapple		Apple	
Amyl butyrate	.. 500 parts	Amyl valerenate	.. 300 parts
Ethyl butyrate	.. 200 "	Ethyl malonate	.. 200 "
Ethyl acetate	.. 50 "	Acetaldehyde	.. 100 "
Acetaldehyde	.. 60 "	Chloroform	.. 50 "
Chloroform	.. 50 "	Geranyl butyrate	.. 45 "
Lemon oil	.. 20 "	Ethyl acetate	.. 200 "
Ethyl methyl-phenylglycidate	.. 10 "	Vanillin	.. 5 "
Propyl valerenate	.. 100 "	Glycerine	.. 100 "
Vanillin	.. 10 "	Mix.	
Mix.			
Raspberry			
Iso-butyl acetate	.. 300 parts		
Amyl acetate	.. 200 "		
Ethyl acetate	.. 100 "		
Clove oil	.. 10 "		
Ethyl butyrate	.. 50 "		
Ethyl formate	.. 50 "		
Ethyl benzoate	.. 10 "		

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PREPARATION OF JAMS AND JELLIES

—By—

Dr. GIRDHARI LAL, Ph.D. (Lond.),

Assistant Fruit Biochemist,

Fruit Section, Lyallpur.

A Jam or a Jelly is a scientific product but with most of the producers in our country and even in foreign countries it usually is a hit or miss affair. For instance if the product is not properly set, addition of more pectin, sugar, or acid, re-cooking, etc., is resorted to. This procedure evidently involves waste of time and money and even after all this a satisfactory product may not be possible. Some of the manufacturers of Jams and Jellies in foreign countries prepare their fruit extracts a day in advance and make small laboratory trial-batches by varying the amount of added pectin, acid and sugar and next morning these sample batches are examined before starting to cook. The recipe giving the best result is the one selected for use in that day's cooking. This is rather a tedious and time-consuming process.

In Jam and Jelly manufacture a considerable difficulty is particularly experienced as to the proper amount of sugar to be added in order to make a product of satisfactory consistency. Too little sugar usually results in a tough jelly, too much, in excessively tender jelly which will not set properly. Insufficient percentage of sugar in the finished product seriously affects its keeping qualities.

The problem of the addition of the right amount of sugar in Jams and Jellies has recently been solved by Professor G. L. Baker of Delaware University (U. S. A.). As a result of more than twelve years' study and researches Professor Baker has invented a small, simple and an inexpensive instrument called the 'Jelmeter' for testing the Jelly or Jam Juice. By taking the viscosity of a definite volume of the juice, he has worked out a scale for the amount of sugar to be added in order to produce a good 'gel.' The Jelmeter as devised by Professor Baker is simply a piece of capillary tube (2.8 inches long) fused to an ordinary glass reservoir (4.0 inches long with 6.0 mm. diameter). The latter part of the Jelmeter has graduation marks for the amount of sugar required for a fruit juice extract to get the standard set for a Jam or Jelly.

NOTE :—Jelmeter can be had at a cost of Rs. 9/- from Messrs. Gardeners Juices (India) Lyallpur; as far as the writer knows this is the only firm in India who stock this instrument.

General Directions for the Preparation of Jam or Jelly from all Kinds of

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Fruits by the "Jelmeter" method

STEP 1 :—Select wash and prepare fruit. Ripe fruit is best. Over-ripe fruit, generally, lacks sufficient acid and pectin for good jelly and is more suitable for Jam-making.

STEP 2 :—Prepare fruit extract for jams and juice extract for jellies by the addition of just the right amount of water and lemon juice (according to directions given in individual recipes given below) and boil for correct number of minutes. In the case of jelly the fruit extract is pressed in a basket type press or hydraulic press (for production on a large scale) and pass the juice through jelly bags (obtainable from Messrs. Gardeners' Juices, Lyallpur) made of flannel. At the end of the cooking process in the case of Jams, strain a small amount of fruit pulp through a thick cloth for Jelmeter test (Step 3).

STEP 3 :—Make the Jelmeter test as follows :—Take about a table-spoonful of the strained juice or fruit-pulp extract and let it cool to approximately the room temperature. Holding finger under small end (bottom end of Jelmeter) pour in the juice until the Jelmeter is filled to the top. Remove finger and allow the juice to drip for exactly one minute, then replace finger and note the nearest graduation mark on the Jelmeter against the level of the juice. This figure shows the cups or weight of sugar required for each cup or unit weight of juice extract. The use of standard measuring cups is best but if these are not available use the same cup (any size) both for measuring juice and sugar. The test can also be carried out by weight

of juice and sugar. For the sake of convenience, cup measurements are given for the preparation of various Jams and Jellies.

NOTE :—If the juice extract flows below the $\frac{1}{2}$ mark line (the lowest mark in the Jelmeter) in one minute more pectin is needed to make perfect jelly. In such cases add $\frac{1}{4}$ cup or $\frac{1}{4}$ lb. of liquid pectin for each cup or lb. of juice.

Stir very thoroughly and repeat the 'Jelmeter' test. If the juice extract does not flow below the $1\frac{1}{4}$ mark (the uppermost mark on the Jelmeter) the juice extract should be diluted with an appropriate amount of water to get readings within the range of the 'Jelmeter.'

A similar procedure is adopted in the case of Jams except that in the case of the test below $\frac{1}{2}$ mark line, two table-spoonfuls of liquid pectin are added per cup of fruit, and after thorough stirring the Jelmeter test is repeated.

STEP 4.—In the case of Jelly add sugar to the juice extract according to the Jelmeter test and for jams add the above amount of sugar and for all readings within the range of Jelmeter also add an extra $\frac{1}{4}$ cup of sugar per cup of prepared fruit. Cook the product as rapidly as possible (for large scale production steam-jacketed kettles are employed) till the temperature reaches about 221°F . (Subtract 1° for each rise of 500 feet in altitude above sea level). When the cooking is finished, pour the product while hot into sterilized (previously boiled for about $\frac{1}{2}$ hour in water)

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glass jars or cans and seal air tight. Jelly should be skinned before packing.

Some Important Jelmeter Recipes

JAMS

APRICOT AND PEACH JAM:—Scald, remove skin and stones, and grind fruit. Add $1\frac{1}{2}$ table-spoonful of lemon juice per cup of prepared fruit. Boil for 5 minutes with constant stirring. Make Jelmeter test. Add sugar as per test and add extra $\frac{1}{4}$ cup sugar per cup of juice, cook and pack as in general directions.

PLUM OR PRUNE JAM:—Wash fruit, discard pits, cut into small pieces or grind. Add $\frac{1}{2}$ cup water and $1\frac{1}{2}$ table-spoonful of lemon juice per each cup of prepared fruit. Boil for 15 to 20 minutes till the fruit is tender. Make Jelmeter test, add sugar as per test and also add extra $\frac{1}{4}$ cup of sugar per cup of prepared fruit, cook and pack as directed above.

QUINCE JAM:—Peel, core and grind fruit. Follow directions as for plum or prune jam.

RASPBERRY JAM:—Wash berries, mash or grind. Add one table-spoonful of lemon juice per cup of crushed fruit. Boil for eight minutes. Make Jelmeter test and add sugar as in other jams. Cook and pack as directed above.

CHERRY JAM:—Wash, stem, pit and crush or grind the cherries. To sweet varieties add one table-spoonful of lemon juice per cup of prepared fruit. Boil for 15 minutes. Add 2 table-spoonfuls of liquid pectin (as the fruit is poor

in pectin), stir well and make Jelmeter test. Add sugar as in other jams. Cook and pack as directed above.

STRAWBERRY JAM:—Remove rotten berries, wash, crush, slice or grind. Boil for three minutes with stirring. Make the Jelmeter test and add sugar as in other jams. Cook and pack as already directed.

JELLIES

APPLE, GUAVA, PRUNE, QUINCE AND SOUR-PLUM:—Fresh tart fruit is best. Wash fruit, discard damaged parts, cut into pieces. Add one cup of water and $1\frac{1}{2}$ table-spoonful of lemon juice per each cup of prepared fruit. Boil 15-20 minutes until fruit is tender. Make Jelmeter test after straining the juice as directed under general direction. Add sugar (no additional sugar is added as in the case of jams), cook and pack as already directed.

RASPBERRY JELLY:—The same as raspberry jam except that strained and clear juice obtained from the prepared fruit is employed for Jelmeter test, cooking, etc. Sugar is added as in jellies.

LEMON JELLY:—Wash, press and strain the juice. Put peels through food chopper and mix with juice. Add $2\frac{1}{2}$ cups of water per cup of prepared juice. Boil 20 minutes. Squeeze as much juice as possible through cloth and then strain without squeezing through a jelly bag. Make Jelmeter test, add sugar and cook and pack as usual.

GRAPE FRUIT JELLY :—Same as lemon, except add only one cup of water for juice extract.

ORANGE JELLY :—Same as lemon, except use one lemon for every 2 oranges and add 2 cups of water.

SOUR CHERRY JELLY :—Wash, stem and pit, crush or grind fruit. Boil for 15 minutes, squeeze and strain as directed in the case of jellies. Add $\frac{1}{4}$ cup liquid pectin per cup of extracted juice. Make Jelmeter test, add sugar and cook as in general directions.

References

1. Campbell's book, Canning, Pickling and Preserving by Clyde H. Campbell. Revised Edition 1937.
2. Principles of Fruit Preservation by T. N. Morris 1933.
3. A leaflet issued on Professor Baker's Jelmeter method of making jams and jellies. The recipes given above have been taken from this leaflet.

CULTIVATION OF LETTUCE

Lettuce i.e., *Lactuca sativa* takes first place as a salad plant and can be grown at almost all elevations in the tropics but to greatest perfection in the hills. It belongs to the same genus as the chicory root which is used as a substitute for coffee. In the wild state it is slightly narcotic and sedative like opium. But these bad properties appear to be entirely removed by cultivation. It is easy of digestion, mildly laxative and moves the bowels and is moderately

nutritious. It is an excellent food for students and professional men who have to do much brain-work. The lettuce seeds sold in the markets are white and come largely from Persia. The price of seeds is about 4 annas a pound, says Mr. P. Ivenger in the "Hindu."

Soil, Climate & Other Factors. In hot climates, as in India, lettuce grows very well everywhere. A moist, cool, light and rich soil, well manured below, as the lettuce has long roots, is the best soil. The soil must be friable, mellow, and well drained, so that much water does not stagnate on the surface. But it grows fairly well even on black cotton soils and red loams, if the soil is rich. It is a cold weather crop. Therefore it cannot be grown to perfection in the summer season. Lettuce like all vegetables succeeds best, if it is grown on land which was heavily manured with cattle dung and other slow acting manures for the previous crop.

Lettuce succeeds best in places where the minimum temperature in winter months is between 50 to 60 degrees. In Madras lettuce grows fairly well and can be sown from August to December and even in the middle of January. If lettuce is grown during the hot weather, the leaves do not form a head, and the plant soon runs to seed. But even such lettuces are quite as healthy and nutritious as the fine blanched white lettuces; and though not crisp are almost as delicious as the fine ones. The lettuce can be cultivated everywhere in India.

Planting and Manuring. The land should be well ploughed, at least twice

in February or March, to a depth of about nine inches. The clods of earth should be broken up and the ground levelled. If the previous crop had not been heavily manured, well decayed farm-yard manure or horse dung, etc., may be applied at the rate of 10 to 20 cart-loads per acre. The more heavily the lettuce is manured, the better is the quantity and the quality of the lettuce crop. For all vegetable crops and especially lettuce, which come to maturity in a few months, it is best to manure heavily the previous crops. Wood ashes and bone meal are considered the best artificial manures for lettuce.

About the Seeds. The seeds are very hard, and take a long time to germinate, sometimes even one or two months. Therefore it is good to soak the seeds in water for 24 hours before sowing. One ounce of seeds will produce from 2,000 to 3,000 plants. $\frac{1}{4}$ ounce of seeds is sufficient for a bed eight feet by five feet; and 3 pounds of seeds will sow an acre.

In India the best lettuce can be grown only from seeds imported from Europe. The plants from Patna seeds, says Speede, will require only 6 weeks to be fit for cutting; whereas English seeds require 8 to 10 weeks from the date of sowing; but the Patna seeds do not always come true. Mr. Woodrow says that the "Poona Brown Cos. Lettuce" is a black-seeded "Cos Lettuce" of very high quality, being tender and crisp and of a delicious flavour. This seed is obtainable in Poona.

In dry districts with a slight rainfall, the rainy season should be half over

before beginning to sow. The "Cos Lettuce" should generally be sown at intervals of 10 days, up to the middle of December. Seeds may be sown in different plots at intervals of 10 days, so as to have a succession of crops. If sown later, it is liable to run to seed without forming a head. Cabbage lettuce is fit for early sowings from the middle of August or even earlier. But in this case the lettuce must be cut when yet small and not full grown. If thus sown at intervals of 10 days very good lettuce may be had from September, till the end of December. Lettuce may also be planted singly, between other vegetables, and along the waterchannels made for irrigation. They come up very well in such situations. The seeds of lettuce keep good for three or four years; seeds one year old are considered the best for sowing, because the quality of the crop is good, and the plants do not flower and run to seed soon. Seeds more than one year old should be tested by sowing a few seeds in a small seed pan, before sowing them in the fields. It is most essential in lettuce cultivation that the seeds be of a really high quality in order to obtain nice crisp, tender hearts and leaves.

The seeds may be sown in drills two inches deep. The drills or furrows may be 16 inches to 24 inches apart; while the soil is still fresh and moist, sow at the rate of 20 to 40 seeds to a foot; and cover the seed with not more than half-an-inch of fine earth. If sown deeper many plants do not come up well. After sowing, the soil must be lightly raked in, and then gently pressed down to prevent ants from carrying away the

seeds. If not carefully watched, red ants will carry away all the seeds in a few hours. Immediately after sowing, to prevent the ants from coming, strew the ground thickly with turmeric water before sowing. To prevent the ravages of ants, seeds are often sown in a shallow seed pan which is placed on an empty flower vase or some other stand, resting on a basin of water. When the plants are about three or four inches high and put forth two or four leaves, they are transplanted in the open ground one foot apart from plant to plant both ways. The soil in the seed-pan may be prepared, by mixing two parts of earth with one part of well-decayed dry leaves known as leaf mould.

Transplanting Etc. In many parts of India, lettuces are not transplanted. They suffer even in Europe more or less by transplanting; and do not come up so well as when sown broadcast on the land where they are to grow and mature. But the transplanting checks the tendency of the plants throwing out flowers and running to seed soon. The one aim in the culture of all green leaf vegetables or "salad plants" is to secure rapid growth of fine leaves and preventing the plants from running to seed as long as possible. To attain this end, rich soil, heavy manuring, and transplanting, are necessary.

If the weather is dry, the lettuce needs irrigation. Lettuce must be watered slightly even once a day or on alternate days. Frequent hoeings in fine weather greatly promote the growth, remove the weeds, and destroy insects and some destructive worms, etc.

To get crisp, white heads of leaves it is necessary with some kinds to close the outer-leaves together, and tie them up rather loosely with plantain fibre, etc. This is done especially in the case of some kinds of "Cos Lettuce," when the plants are almost big enough to cut for being eaten. Blanch only as many plants as are needed for sale or use. Lettuce rots, if blanched by tying or covering it for more than 14 days. It can be well blanched in 10 to 14 days.

Harvesting. Lettuce is ready to be cut for eating in about 2 months from the date of sowing. At 1 plant per sq. ft., 1 acre yields about, 43,000 heads of lettuce, in less than 3 months. Each lettuce on an average weighs about half a pound, and thus the outturn is about 10 tons per acre. Even at the low price of 1½ rupees per 100 heads, in 3 months, a good gardener can get about Rs. 600 per acre. It is therefore considered in Europe and America, and in parts of India, as very profitable to grow lettuce. The conditions for success are:—

- (1) Rich friable light loamy soil.
- (2) Uniform (even) moisture in the soil.
- (3) Full exposure to sunlight.
- (4) Gathering the crop early in the morning when the leaves are cool and stiff.
- (5) Handling it without exposing it to the sun as far as possible; and above all.
- (6) Use of superior pure seed of good varieties suited to the District.—"The Industry."

TREES FOR YOUR BANGALOW PREMISES

—By—

H. S. DINSA, M.Sc. (Kansas),

(Offg.) Asstt. Fruit Specialist, Lyallpur.

Trees are a desirable asset to the landscape design of bungalow premises. The first restful feature is the shade they provide in this hot climate of ours also to shade the building from the afternoon heat of the sun. Two points are worth considering here. First, the trees must be shady but should not be constantly shedding leaves and causing a constant litter. Secondly, it must not have large limbs or branches which may break at any time (such as those of *Albizia Procera*) without any apparent sign of their doing so, thus endangering the building and even human life.

Trees are also useful for "framing" certain views and "enframing" buildings as well as the estate. They also serve a useful purpose of warding off hot and dry winds during summer.

Flowering trees are desirable to add colour to the surroundings; no one can deny the beauty and effectiveness of a tree when it is in blossom.

For purposes of selection a few trees of shade, foliage or blossoms are given below with a brief description of each :—

I. Shade Providing Trees

(1) AEGLE MARMELO (Bil) :—
An evergreen compact headed tree with

spines. A fine ornamental specimen. Bears a medicinally or otherwise desirable fruit of the size of an orange. Grows to a height of 30 to 35 feet. Is fairly hardy.

(2) AVERRHOA CARAMBOLA :—
A splendid ornamental tree with a dense conical head having feather like foliage. The leaves are of a fine cut and light green in colour. It bears pentangular fruit of lemon colour and size which is edible and relished for its acid taste. Grows to a height of about 30 feet.

(3) CELTIS AUSTRALIS (Kar) :—
A shapely tree with an open habit of growth; has pendulous young branches which give it a graceful look. It is beautiful in all seasons even when leafless due to its graceful spreading, thick, smooth grey limbs. Grows to a height of about 40 to 45 feet.

(4) CINNAMONUM CAMPHORA (Camphor or Mushak Kafoor tree) :—
An upright tree of stately growth; giving good shade. Its leaves are glossy and when crushed give an odour of camphor. Grows to a height of about 40 to 50 feet.

FICUS :—A group of large shady trees resistant to drought but require ideal moisture conditions. One of the

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following kinds are desirable to have for shade (*F. benjamina* and *F. retusa* are the prettiest of all and are also excellent as specimen trees) :—

(5) **FICUS BENGALENSIS** (Bori tree) :—Very large and spreading with aerial roots. It is recommended for only spacious locations and away from the main lawn as nothing will grow underneath the tree, not even grass.

(6) **FICUS BENJAMINIA**:—A fine example of shade and beauty; has a fairly large spread but not as tall as the above two trees. Foliage is an attractive glossy green, leaves being small and oval. The small orange-red fruit which the tree is laden with throughout the year sets off the attractive foliage.

(7) **FICUS ELASTICA** (Rubber tree) :—Upright but spreading with large leathery and shiny leaves. It prefers a damp location.

(8) **FICUS INFECTORIA** :—Deciduous, forms an upright and compact head of deep crimson foliage in late spring when shedding occurs but is replaced within a week by new foliage which provides excellent shade. The tree is rapid in its growth.

(9) **FICUS RELIGIOSA** (Pipal) :—A tree about the same size as *F. Ben-galensis*.

(10) **FICUS RETUSA** (Bori) :—A spreading upright tree with small oval leathery green foliage is also a fine specimen as well as a shady tree. Bears

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aerial roots which seldom touch the ground to strike root as in *F. bengalensis*. Grows to a height of 30 to 40 feet.

avenue tree but gives off an offensive odour when in blossom during May. Height 80 to 90 feet.

(11) **KIGELIA PINNATA** (Fanoos tree) :—An ornamental as well as a shady tree. Forms a compact round head. It bears beautiful inverted flowers at the end of a long string like drooping growth. Loves moisture. Grows to a height of 30 to 40 feet.

(12) **MIMUSOPS ELENGI** (Maulsari) :—A very beautiful shapely, compact tree; slow growing but desirable for the delightful fragrance of the large number of small white blossoms borne in spring and used for making scented oil for toilet use.

✓ (13) **PUTRANJIVA ROXBURGII**:—An ornamental tree, slow growing in early years. Has a deep green leathery and shining foliage. It is of a compact habit with gracefully drooping branches. Shade, as well as avenue tree. Attains a height of about 30 to 35 feet.

(14) **TAMARINDUS INDICA** (Imli) :—An ornamental shady tree with a compact, round head, with terminal branches drooping gracefully; quite hardy. Its fruit is prized for its use in kitchen recipes and also as medicine. Makes a good roadside tree. Those produced from seed grow quite large while those raised by "gootee" are said to remain comparatively smaller.

(15) **TERMINALIA BELERICA** (Bahera) :—A large shapely tree with broad foliage. Desirable as a shade and

II. Flowering Trees

(Their Size, Colour & Time of Flowering)

(1) **BARRINGTONIA ACUTANGULA** :—May grow to a height of about 50 feet along seashores. Has large, leathery and glossy green leaves. Flowers of pinkish red colour are borne in long pendulous racemes in July.

(2) **BAUHINIA VARIEGATA** (Kachnar) :—A splendid mass of white and purple blossoms when it flowers in February. The unopened flower buds are also used as pot-herb. Grows to a height of about 20 to 25 feet. The tree does not look attractive unless pruning of dead and weak branches is regularly attended to.

(3) **CASSIA FISTULA** (Amaltas) :—Open headed with graceful foliage. Grows to a height of about 30-40 feet and bears a mass of yellow pendulous flowers during May and June. Its long pods are ornamental and well-known for their medicinal value.

(4) **ERYTHRINA BLAKEI** :—Flowers are of a most brilliant scarlet red; borne in summer. Is a slow growing small sized tree about 20 to 25 feet high with a spreading habit.

(5) **ERYTHRINA INDICA** :—Deciduous. Grows in a compact upright pyramidal form to a height of about 50 feet. Bears deep orange red flowers in clusters late in spring when it is leafless

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A fine ornamental and avenue tree, especially when in foliage.

✓(6) GREVILLEA ROBUSTA
(Silk oak) :—A large, sturdy tree of pyramidal shape with fine lace like foliage silky on the underside. A fairly graceful ornamental or avenue tree. Bears peculiar orange coloured blossoms in clusters in the month of April.

(7) JACARANDA MIMOSAEFOLIA :—The blue blossoms of this tree are its chief characteristic, although the tree is also attractive due to its fern like foliage. The blossoms appear in fair profusion during April. It grows to a height of about 30 feet.

(8) LAGERSTROEMIA FLOSS-REGINAE:—A large, spreading and handsome evergreen tree about 30 to 35 feet high. The foliage is long and broad.

The tree is very attractive when it bears light purplish or lilac flowers. It loves a sheltered and moist position.

(9) LAGERSTROEMIA INDICA :—There are three varieties of this tree bearing pink, white and lavender coloured flowers respectively.

It is a small tree or almost a shrub when pruned. There can be nothing as charming and bright as when this is in blossom. The flowers are borne during June, July and August on large panicles.

(10) PUNICA GRANATUM (Pomegranate-Anar) :—A small deciduous tree, extremely beautiful when in full blossom with its tubular deep orange-red flowers scattered singly over the tree. It is also very pretty when in fruit along with its shining leathery green foliage.

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WHAT TO DO IN YOUR ORNAMENTAL GARDEN DURING THE
RAINY SEASON

(H. S. DINSA.)

1. Though a little late but Cannas may be transplanted during July for early flowering.
2. Layering of certain creepers and climbers.
3. Gathering of seeds of summer flowering plants such as Zinnia, Amaranthus, Salvia, Balsam, etc.
4. Clipping of hedges require more attention to keep them neat.
5. Planting of trees and shrubs, etc.
6. Sowing seeds (from middle August to last week of September) of annuals meant for flowering during next spring.

HEALTH NOTES

Heart Trouble (Palpitation).—

Practise deep breathing and some light exercises every morning, followed by a tepid bath and rub down. Walk regularly every day; start with a moderate pace and distance and gradually increase both from day to day, and when you can hurry without being distressed start running in the same manner. Skipping is also a good exercise. Drink plenty of water and include in your diet fresh fruit, figs, dates, raisins, apricots, green vegetables, lettuce, watercress, milk and dairy produce,

underdone meat, dish gravy, liver, etc.

Boils:—If you are subject to boils you must take care of your diet, which should consist largely of fruit, salads, green vegetables, cereals, brown bread, dairy produce, etc., and meat in moderation. You should restrict your consumption of white bread, potatoes, cakes and pastry, jams, preserves and sweets. You should avoid rich food, fried food, twice-cooked meat, spices, condiments, vinegar, pickles, etc. Drink plenty of water, and sip a glass of hot water and lemon juice on rising and retiring.—
“H. & S.”

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PREPARATION AND USE OF BORDEAUX MIXTURE AS A FUNGICIDE

—By—

K. R. VERMA, B.Sc.,
Fruit Expert, Indian Mildura Fruit
Farm Ltd., Renala Khurd.

Bordeaux mixture continues to be the most generally used of all fungicides. Its effectiveness and harmlessness to plants depends upon care taken in its preparation and on the condition of the atmosphere and the plant. The formula ordinarily used is 5-5-50 and is entirely harmless when the plant is dormant. It may also be used on some growing plants, others it will kill or greatly injure. By the 5-5-50 formula is meant.

(a) Copper Sulphate	5 Pounds.
Stone Lime	5 Pounds.
Water	50 Gallons

The weaker solution is:—

(b) Copper Sulphate	3 Pounds
Stone Lime	5 Pounds.
Water	50 Gallons

To mix, place the Copper Sulphate in a gunny bag and suspend it in a wooden barrel containing 25 gallons of water. (Note that it is not to be put into the barrel). Slake the lime in a wooden tub by adding water, a little at a time, and make into a thin paste. Place the paste into a second barrel with 25 gallons of water. Agitate thoroughly when cool before attempting to mix the two solutions.

If a large amount of spraying is to be done, stock solution with larger quanti-

ties should be prepared. The volume can be made up afterwards by adding water.

If hydrated lime (slaked lime) is used add one-fourth more than is given in the formula.

If sufficient lime is not used in the mixture, there is a danger of injuring the foliage. To prevent this, the mixture should be tested before use with any of the three tests given below.

(a) Take a small quantity of the mixture on the palm of your hand and hold it towards the sun. Blow gently into it. If a thin film forms on the surface, there is sufficient lime present, if not add more until the film forms.

(b) Dip a clean steel blade of a pocket knife into the solution and hold it there for a minute or more, if there is a deposit of copper on the blade when removed, more lime must be added.

(c) Get a few grains say quarter of an ounce, of pot-ferro-cyanide in crystal form. Place this in an ounce bottle and fill it with water. Take a pint of spray mixture which is ready for application and pour a few drops of ferro-cyanide solution into it. If a dark reddish brown precipitation results, add more lime till no precipitate is formed.

SOOTY MOULD ON CITRUS PLANTS AND ITS CONTROL

—By—

DYAL SINGH JOHAR, M.Sc.,

Mycological Assistant, Lyallpur.

Sooty mould is found to a certain extent in almost every garden in the Punjab, but in certain orchards (in Kangra District) it has been seen to appear in a severe form infecting all the leaves and even fruits with a black incrustation, consisting of a weft of black mycelial threads of fungi of more than one species usually. When complete incrustations are formed, sunlight cannot penetrate the leaf tissue and consequently normal physiological processes of the leaves are interfered with. Not only is the formation of starches and sugars, so necessary to the growth of the plant, reduced, but it has been observed that the fruits so covered have a sour and fermented taste. The yield is often very much reduced. Where fruits are covered in patches by the sooty incrustations of the mould, they develop a mottled appearance which may be seen on removing the incrustation from the fruits. This is due to the fact that the covered patches do not ripen with the rest of the fruit surface and thus retain a light green colour. Sometimes leaves covered with sooty mould curl and shrivel-up under dry conditions. The black covering of sooty mould is, however, entirely superficial and may easily be rubbed off. Under dry con-

ditions, the mould becomes detached and is blown off in bits by the wind.

Sooty mould is generally found abundantly in orchards where trees are very closely planted or where the trees are shaded by other tall trees around them, so that sun light is interfered with and the atmosphere remains more humid. The following fungi have been found to take part in forming the sooty incrustations, viz., *Acrothecium lunatum*, *Capnodium citri*, *Alternaria citri*, *Cladosporium herbarium* Var. *citricola*. The composition of the mould differs in different places and in different seasons. The presence of *Alternaria* sp. in sooty moulds may lead to infection of the fruits at the stylar end (end away from the stem) causing black rot of oranges and also dropping of immature fruits.

Sooty mould thrives on the honey dew secreted by the scale insects and the control of the disease depends to a great extent on the control of this insect pest, for in the absence of their excretions, the mould soon disappears. The following spray mixture should be used:

Part A

Copper sulphate ..	4 lbs
Unslaked lime ..	4 lbs
Water ..	50 gallons

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Part B

Resin	..	2 lbs
Washing soda	..	1 lb
Water	..	1 gallon

The constituents of part B should be boiled till the solution becomes of amber colour. Add part B to part A of the solution. The spraying mixture is

now ready for use and can be sprayed for checking the fungal disease and insect attack.

N.B.—This spray formula was used, against sooty mould disease, in the Citrus orchards of the Hon'ble Mr. Justice Tek Chand, at Nurpur, (Kangra District), and was found very effective.

POTASH DEFICIENCY SYMPTOMS IN FRUIT TREES

—By—

SANGAT SINGH, M.Sc. (Agri.),

Fruit Section, Lyallpur.

The book entitled "Potash Deficiency Symptoms" is published by Eckstein, Bruno, Turrentine of the K. Company and is available from N.V. Over Zeache Kali export Maat Schap-pij 8, Infantry Road, Bangalore. The authors have compiled the results of scientific research carried out by different workers at various research stations and the main findings are contained in the following resume:—

The most prominent symptom of potash deficiency is "Leaf Scorch," considered to be due to a higher rate of transpiration over root absorption, ultimately resulting in the death of cells around the leaf margin. Various fruit plants show considerable differences in their susceptibility to "Leaf Scorch," e.g., apples, goose-berries and red currants have high susceptibility. Raspberries are fairly susceptible. Plums, pears, black currants and straw-berries are generally less susceptible, though

certain varieties of these are exceptions to the rule.

Development of "Leaf Scorch":— During the early part of the season leaves appear to be normal but in early June characteristic symptoms of potash deficiency appear. The colour of leaves at this stage, is often bluish-green with their margins slightly pale. In some varieties of plums these symptoms are well marked. Edges of leaves have a tendency to curl under, but in certain plums they curl upwards. The leaf margin finally becomes brown or grey, thus presenting a scorched appearance. The chemical analysis of scorched trees revealed deficiency in potash.

Importance of Nitrogen & Potash Balance:— Several trials have definitely shown that a proper balance between nitrogen and potash is the secret of successful manuring of fruit trees. Manorial trials at East Malling by Wallace showed that applications

of nitrogen alone may, upto a point, produce more cane length (in Raspberries) but they never have increased the crop, except when potash was applied.

Effect on Yield & Size of Fruit:— It is claimed that potash deficient fruits are usually small and poor in colour retaining an immature appearance in store. Potash deficient fruits usually wilt badly and are more susceptible to low temperature-breakdown.

Effect on Colour of Fruit:— Experiments carried on by Hoblyn on desert apples, showed that colour in case of Worcester Pearmain apples and Bramley apples was dull in the case of potash starved trees. In case of grapes it has been observed that, in potash starved grape bunches, ripening is late and not uniform. Potash starved citrus trees yield thick-skinned fruit with bluish-green pointed leaves.

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THE PUNJAB FRUIT JOURNAL

HORTICULTURAL KNOWLEDGE FROM FAR AND NEAR.

1. Influence of Environment on Citrus.—Environmental factors exert a great influence on the growth of fruit trees. Dr. Webber's observations in California show that temperature is the predominant factor which affects the time of flowering and fruiting of oranges. Length of day is of very minor importance. Allowing for differences due to individual or varietal characteristics and differing physical conditions 55°F may be taken as the correct Zero or Vital temperature for citrus growth. Atmospheric humidity influences the size, shape, character and quality of the fruit, the roundest, smoothest, thinnest skinned, juiciest and best flavoured fruits with the least fruit drop being grown in districts where humidity is highest.

2. The Alternation of Heavy and Light Crops in the Valencia late Orange.—There is a tendency, though not to a great extent, of bearing heavy crops in alternate years in case of citrus. Barnard and Allan have carried out thinning experiments on Valencia late orange in Australia. They found that thinning the fruit of the Valencia late orange by 30 to 40 per cent early in the season in "on" year caused a slight increase in the ultimate size of the fruit left on the tree and considerable increase in the number of blossoms set and fruit formed in the following season. Harvesting the crop 3 months before the normal time in the "on" season increased the set for the following season as compared with trees

harvested at the normal time. When the fruit was left on the tree 3 months beyond the normal picking time the number of fruit harvested the following season was not affected but the size was decreased. It is concluded that an early thinning of up to one-third of the crop in the "on" year combined with an early harvest should contribute to more even annual yield.

3. The Nutritive Value of Papaya:—Miller and Robbins analysed Papayas (Arind Kharbuza) grown in Hawaii for organic nutrients, calcium, phosphorus,

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iron, chlorine, and acid base balance. They have found that papaya compares favourably with oranges as a source of calcium, basic ash and ascorbic acid. The vitamin C content of papaya increases with ripeness.

4. Influence of Manurial Treatment on Yield and Storage Quality of Cox's Orange Variety of Apples:—Rigg and Chittenden carried out manurial experiment of nine years' duration with 30 trees of Cox's Orange Pippin on poor Mountere Hills soil in New Zealand. The trees were divided into 2 plots and the fertilizer given each year as follows:—
Plot 1, 4 lb Superphosphate, 1 lb potassium nitrate, 1 lb ammonium sulphate; plot 2 as in 1 but 3lb ammonium sulphate instead of 1 lb. Yields and storage qualities were carefully noted. The results show the great importance of the use of liberal nitrogenous manuring in conjunction with both phosphates and potash in maintaining adequate tree growth and fruit yield. In view of the some what high fungal rot and internal breakdown occurring in fruit from plot 2 it is, however, suggested that 2 lb ammonium sulphate would probably have been preferable to 3 lb.

5. "Wound Dressing for fruit trees":—Besides natural injuries, regular pruning of fruit plants necessitates the creation of a large number of wounds on the limbs and branches of the plants. These wounds, if left open, act as most suitable breeding grounds for germs and fungal spores of various diseases. They also devitalize the tree by exuding out a lot of sap and moisture. The proper dress-

ing of such wounds is, therefore, very essential.

Various applications are used for dressing wounds of fruit trees. Below is reproduced from Horticultural Abstract March 1938 the work of G.D. Atkinson in New Zealand conducted during the year 1935-36. The dressings were tried on Slurmera and Dougherty apple trees 25 to 30 years old.

Coal tar. caused definite bark injury extending sometimes beyond the area actually covered. A little callus (healing of wounds) developed on some of the wounds.

Creosote:—Extensive damage, more serious than that of tar, resulted. There

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was no callusing, i.e., no healing of wound.

Bitumistic Paint:—"Colasmix." A slight tendency to lift but usually the cover remained pliable and complete. The bark was undamaged and callusing normal.

White Lead Paint.—A pronounced tendency to crack and flake off. Slight bark damage but less than with coal tar. A small amount of callus was visible on some of the cuts.

Chavostelon's Formula:—(Equal parts 6% aqueous solution of copper sulphate

and 6% aqueous solution of potassium bichromate.) :—

Caused extensive bark injury similar to creasote damage. No callus formed.

Untreated Wounds:—The bark died back a short distance from the edge of the cuts and a small amount of callus tissue formed.

The conclusion drawn is that the Bitumistic paint is a cheap and efficient wound-covering which may be used with safety.

SANGAT SINGH, M.Sc. (Agri.),
KHUSHAL SINGH, B.Sc., (Agri.)

ANNALS OF THE BOARD

—By—

K. L. KOHLI, M.A., L.S.G.D.,
Ass't. Secretary, Punjab Provincial
Co-operative Fruit Development Board.

During this quarter the Fruit Journal Standing Committee and Fruit Marketing Standing Committee of the Board met on 6th and 7th May, 1938, respectively and the decisions arrived therein along with other vital matters were reviewed in the Managing Committee meeting of the Board held on June 7, 1938. Salient developments during this quarter are reported as under:—

1. The Fruit Marketing Scheme Prepared by the Agricultural Marketing Section Punjab:—S. Pritam Singh, Assistant Marketing Officer (Fruits) submitted outlines of the Co-operative Fruit Marketing scheme for consideration of the Board in the meeting of Fruit Marketing Standing Committee held on

May 7, 1938. The scheme envisages besides organisation of a Central Fruit Marketing Clearing House at Lahore, a net work of Co-operative Fruit Trading Societies affiliated to the Board in a selected number of fruit producing centres of the province. The Managing Committee in its meeting of June 7, 1938, approved, in substance, the scheme in question, and have entrusted the Marketing Officer, Punjab, to work out the detailed financial and constitutional aspect of the scheme in consultation with the experts of the Co-operative Department.

2. The Old Fruit Market Site Outside Shahalmi Gate:—In view of a tripartee meeting of 14th January, 1938,

held between the Director of Agriculture, Punjab, the Administrator Lahore Municipality and the Hon'ble Secretary of the Board, it was expected that the Lahore Municipality might undertake the question of setting up of modern fruit market at Lahore, and thus relieve the Board of a part of these arduous exacting duties. But after prolonged waiting the Administrator, Lahore Municipality, in view of other preoccupations, has expressed his inability to undertake the task and that as head of the Lahore Municipal Administration he had no objection to the Board taking over the proposed Nazool plot outside Shahalami Gate. The Executive of the Board has accordingly decided to take immediate measures to approach the Local Government to acquire the lease of the promised Nazool plot outside Shahalami Gate Lahore so as to enable it to give a start to the marketing scheme this winter if possible.

The Director of Agriculture Punjab and others concerned have been requested to expedite the matter. A deputation of the Board is also shortly waiting on the Deputy Commissioner Lahore and the Commissioner Lahore Division in connection with the above.

3. Offer of Sultan-ki-Sarai as an alternative site:—A very spacious site known as Sultan-ki-Sarai near Lunda bazar Lahore was recently offered by the Manager, Kashmir State Property as an alternative site for the intended marketing scheme. Negotiations are afoot for settlement of rent, etc.

4. Progress of the Punjab Fruit Journal:—The publishing section of the

Board has continued to make an alround steady progress. The Journal is becoming increasingly popular with readers in and outside the Punjab, which is evident from the fact that there has been an increase of over 75 per cent in the number of subscribers (non-members) since 30th October, 1937. The journal has proved to be a complete success from the financial point of view and shown a surplus of over a thousand rupees for the period commencing from 1st August, 1937 to 31st January, 1938, as audited by the Co-operative Department. The journal has been highly commended by the Commissioner Rural Reconstruction Punjab and strongly recommended by him for subscription to all Deputy Commissioners, Chairmen of District Boards, Dehat Sudhar Committees, etc. In view of the considerable increase in the volume of publication work of the Board, it has been decided to engage a part time Assistant Editor as soon as a suitable man is forthcoming.

5. Accounts of the Board:—The half-yearly audit of the Board for the period commencing from 1st August, 1937 to 31st January, 1938 was conducted by Raja Abdul Hamid, B.A., Inspector Co-operative Societies Lyallpur, on 19th May, 1938. For the benefit of members the audited balance sheet and profit and loss Account of the Board for the period under reference are reproduced at the end of this section.

6. Demand for Increased Subsidy for the Board:—A strong representation for conversion of the current non-recurring Subsidy of Rs. 2,500/- into an annual recurring subsidy of at least

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Rs. 5,000/- was addressed to the Director of Agriculture, Punjab on 30th April, 1938. After this followed a discussion of the matter in the Managing Committee meeting of 7-6-1938 when it was decided that a deputation of the Board should wait on the Hon'ble Premier and other Ministers to accomplish the above as well as to get a substantial special subsidy out of the Rural Development Fund recently created by the Punjab Government. The matter is having the active consideration of the President of the Board.

7. Adequate Supply of Water for Gardens:—This matter is having the close consideration of the President of the Board. A deputation of the Board is expected to be organised to wait on the Hon'ble Minister for Revenue and the Chief Engineer Canals as soon as the Simla Session of the Punjab Legislative Assembly is over.

8. The Provincial Fruit Show:—The proposal of holding the Provincial Fruit Show under the management of the Board had been under consideration since January, 1938. The Managing Committee, however, after considering everything have decided that in view of the inadequate finances of the Board, it was inadvisable to attempt to undertake running of the Provincial Fruit Show. The Committee, however, decided to make the following representation to the Director of Agriculture, Punjab to introduce the following radical changes in the running of the future shows:—

That the duration of the Provincial Show should be increased to a fortnight or so, and the exhibitors therein

may be allowed to make unrestricted sales as is the case in all other exhibitions. And further that with a view to fully represent the growers point of view in award of prizes the Board may be given at least one third representation on the judging committee.

9. Kotgarh Fruit Growers Association reiterates Demand for construction of Hindustan Tibet Road for motor traffic.

Mr. Stayanand Stokes, Secretary Kotgarh Fruit Growers Association, has informed us that a well attended meeting of the Association was held in the last week of June, 1938 wherein the previous resolution on the subject of opening the Hindustan Tibet Road for controlled motor traffic was re-affirmed. (We have every hope that the Hon'ble Minister for P.W.D. will take suitable measures to remove this long standing grievance of the zamindars of the Simla Hills.—Ed.)

10. Minister P.W.D. and other distinguished gentlemen enlist themselves as Life Members of the Board.

The following are the fresh important additions to the Life Membership of the Board.

1. The Hon'ble Capt. Malik Khizar Hayat Khan, Tiwana, O.B.E., Minister P.W.D. Punjab, Lahore.
2. Sir Daya Kishan Kaul, Lawrence Road, Lahore.
3. The Hon'ble Mr. Justice Bakhshi Tek Chand, Judge High Court, Lahore.
4. Mr. Champa Lal, Executive Engineer, Montgomery.

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5. B. Gauri Shankar, Manager, Parkarabad, Estate, District Sheikhupura.	Stock	Rs. As. p.
6. K. B. Nawab Maula Bakhsh, C.I.E. Iftabad, District Lyallpur.	*Bills recoverable (on account of Adver- tisements, etc.)	194 0 0
7. Mr. Abdul Hamid, Managing partner (Ferozsons) 119, Circular Road, Lahore.	Previous Loss as per Balance Sheet of 31-7-37	421 0 0
8. Mr. Atta Mohd. Bodla, Jand- wala, Bime Shah, District Ferozepore.	Loss as per attached Profit & Loss A/c	1,313 6 0
9. Mr. G. E. C. Wakefield, C.I.E., O.B.E., Managing Partner, Northern India Farms, Muree Road, Rawalpindi.	Total	251 1 3
10. The Model Town Society, Model Town, Lahore.		7,454 2 3

*This item on 30th April,
1938 has been reduced
to 111|8|.

Note:—803 copies of the
Punjab Fruit Journal
valued at annas -|8|-
per copy

401 8 0

967 sets of Bulletins
valued at Rs. 1|12|-
per set plus annas -|8|-
cost of additional one
copy of Bulletins on
Egypt

1,692 12 0

Total 2,094 4 0

To total estimated value i.e.
Rs. 2,094-4-0 is not shown in the Balance
sheet on Asset side, because that
would unnecessarily inflate profits which
may not be realised to the full.

I have audited the above balance
sheet of the Punjab Provincial Co-
operative Fruit Development Board,
Ltd., as on 31-1-1938. In my opinion
such balance sheet, subject to remarks
given in the audit report, exhibits the
true and correct view of Board's affairs,
to best of my information and the ex-

BALANCE SHEET OF THE PUNJAB PROVINCIAL FRUIT DEVELOPMENT BOARD, LTD., AS ON 31-1-1938

Liabilities:

	Rs. As. p.	
Membership Subscription	5,640 3 0	
Local Bodies		
Contributions	620 0 0	
General Donations	10 0 0	
Suspense Account	130 0 0	
Printing Bills payable	885 0 0	
Establishment payable	120 0 0	
Petty Bills payable	48 15 3	
Total	7,454 2 3	

Assets:

	Rs. As. p.	
Pb. Prov. Co-op. Bank		
Saving Deposits	4,633 13 0	
Lyallpur C. Co-op. Bank		
Current Deposits	630 14 0	
Imprest Balance with Hony. Secretary	10 0 0	

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planation given to me and as shown by
the books of the Board.

(Sd.) ABDUL HAMID KHAN,
(Auditor),
Inspector, Co-operative Societies,
Lyallpur.

Dated, 19-5-38.

(Sd.) K. L. KOHLI,
Asstt. Secretary,
Pb. P. C. Fruit Development Board,
Lyallpur.

Dated, 19-5-1938.

**Profit & Loss Statement of the Punjab
Provincial Co-operative Fruit Develop-
ment Board from 1st August, 1937 to
31st January, 1938.**

Profits:—

	Rs. As. p.
Profits of the Punjab Fruit Journal	1,099 11 6
Profits of the Bulletins	314 15 6
Interest recovered on Deposits with Banks	44 11 9
Total	1,459 6 9
Net Loss	251 1 3
Total	1,710 8 0

Rs. As. p.	
Losses:—	
Printing Bills of the Punjab Fruit Journal payable	300 0 0
Printing Bills of the Bulletins payable	585 0 0
Establishment paid	450 0 0
Establishment payable	120 0 0
Postage	74 8 6
T.A.	73 12 0
Stationery	44 3 6
Printing (General)	38 10 0
Publicity	7 8 0
Tonga Charges	6 14 0
Sundries	8 0 0
Banking Charges	2 0 0
Total	1,710 8 0

(Sd.) ABDUL HAMID KHAN,
(Auditor),
Inspector Co-operative Societies,
Lyallpur.

Dated: 19-5-1938.

(Sd.) K. L. KOHLI,
Asstt. Secretary,
Pb. Prov. Co-op. Fruit Development
Board,
Lyallpur.

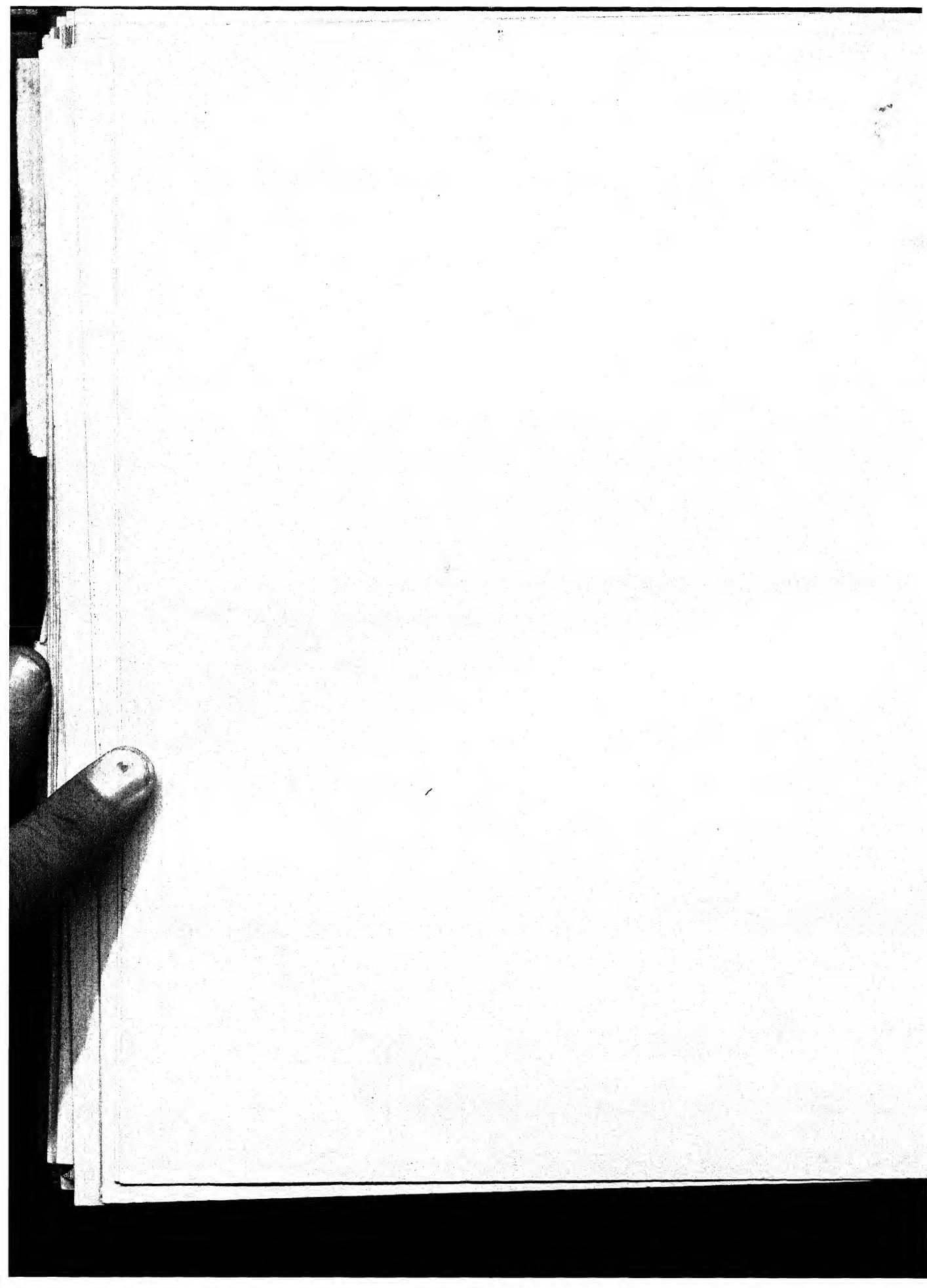
Dated: 19-5-1938.

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THE PUNJAB FRUIT JOURNAL

Vol. 2

LYALLPUR, OCTOBER 1938.

No. 8

RADIO TALK ON FRUIT INDUSTRY.

By

S. S. LAL SINGH, M.Sc. (California),

Fruit Specialist, Punjab, Lyallpur.

[S. S. Lal Singh, Fruit Specialist, Punjab Government, sometime ago broadcast a radio talk on fruit industry, and we feel no hesitation in reproducing the same in our journal as the same is bound to be read with interest.—Ed.]

When asked to broadcast a fifteen minutes talk on fruit gardening, I found myself in a quandary as to what aspect of this industry I should discuss, as the subject is a very vast one. Considering that talk is in English and is to be delivered as late as 9-45 p.m. when I can expect to reach only the intelligentsia, I decided not to talk on the practical side of fruit gardening but give my listeners a bird's eye view of the scope of this industry in our Province, its present status in comparison with other countries and finally the economic advantage that can accrue to our country from its development.

Fruit Essential for Health. The days are long passed when fruit consumption

was considered a luxury or a monopoly of the rich. The fruit has now come to be recognised as an essential part of human diet. Leading medical authorities all over the world, no less than our own wise Hakims and Vaidas, are increasingly prescribing the use of fruit in daily diet. Our sages of the past were wise, indeed, in living mainly on fruits. Fruit is more particularly needed for those who have to do real intellectual work, and it is no exaggeration to say that the civilisation of a country can be very largely gauged by the extent of fruit consumption in that country. I wish I had time to dilate upon the dietetic values of fruits and their chemical composition. Suffice to say for the present, however, that although certain fruits are rich in carbo-hydrates, proteins and fats which are needed for the sustenance and growth of human life, yet their main value lies in their being very rich in the mysterious substances, which are called vitamins and which

have been proved to be indispensable for human health.

Suitability of Our Country for Fruit Growing. After appreciating the value and place of fruit in human diet, permit me to say a few words about the scope of this industry. India is essentially a vegetarian country and consequently the development of fruit and vegetable industry should have been its first concern. We have also been growing fruits from time immemorial. According to some eminent horticultural authorities of the world, some of the fruits are even native to India, which supplied them to the world. Our peasantry is hardy, our soil is rich and irrigation facilities are ample. We have the largest canal system in the world. Our country—a vast continent—has almost every kind of climate suitable for the production of almost every kind of fruit grown in the world. Not to speak of India as a whole, even the Province of the Punjab can boast of a great variety of climate. We have high hills like Kulu Valley, Kot Garh, etc., which can and actually do grow, to almost perfection, cold region fruits like apples, pears, cherries, persimmons, walnuts, etc. We have sub-mountainous tracts suitable for growing fruits preferring moderate climate like peaches, plums, apricots, almonds, loquats, etc. Vast plains of the Punjab with her canal colonies are suited for citrus fruits, mangos, guavas; and lastly the hot districts in the South Western Punjab—D. G. Khan, Muzaffargarh, Multan, etc.—can grow hot region fruits like dates.

But we must confess to our utter humiliation that in spite of all these

favourable conditions of climate, soil, irrigation facilities, hardy peasantry coupled with our love for fruits and vegetables, India finds no mention in the fruit trade of the world. It must be revolting to the self-respect of every Indian that we, who actually gave several varieties of citrus to the world centuries ago, should actually be importing now thousands of tons of oranges from abroad. We can grow finest dates, yet we are annually importing fifty-three lacs rupees worth of dates alone.

Fruit Industries of Other Countries.

As compared with other countries we find ourselves hopelessly backward even in fruit farming both in regard to area and standard of gardening—total fruit acreage in the British Punjab in 1933 being about 62,000 acres in solid blocks and that too mostly in wretched condition. The Punjab Fruit Development Board has rendered a great service by publishing a series of four bulletins dealing with fruit industries of Egypt, Palestine, Italy and France & Switzerland based on the observations which I made during my last tour to these countries. I may be pardoned for referring to a few facts given in these bulletins in the hope that it may arouse our people from their proverbial slumber. Egypt with only half the population of the Punjab has started to develop its fruit industry in right earnest. Its budget for Horticultural Section alone is about 14 lacs of rupees, which is almost 2/3rd of the total agricultural budget of the Punjab Government; experimental and demonstration gardens covering several thousand acres are being established and lacs of nursery

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plants are being supplied free of cost to the public. Special subsidies are being offered and special legislations are being enacted to develop their fruit industry on proper lines. Palestine with a population of about five per cent of the Punjab (equivalent to that of one district here) exports annually several crore rupees worth of oranges alone. Its citrus area has increased 800 per cent within a short period of eleven years. Whereas in the Punjab there is one acre of fruit garden, and that also in wretched condition, for every 400 men, there is one acre of garden for every seven men in Palestine. California also, with only about $\frac{1}{4}$ th population of the Punjab has about 20 lacs of acres under fruits, i.e., one acre for every 2—3 men. For every 1,000 acres of cultivated area, California has about 250 acres under fruit gardens against two acres in the Punjab. Italy with a population of only about 75 per cent more than that of the Punjab has about 1.72 crore acres under fruits. And her garden produce accounts for about $\frac{1}{3}$ rd of her total export. In order to raise the standard of gardening, Italy did not hesitate to enact special legislations, to even remit land revenue for a number of years to those adopting an approved system of fruit gardening. France, a country of small holdings and with a population of about 77 per cent more than that of the Punjab, has about 35 lacs of acres under grapes alone.

When I state that our country offers the greatest scope for the development of fruit industry, I may assure my listeners that I am not indulging in any idle talk or wild imagination but

it is a simple expression of my firm conviction based on my long experience during my ten years stay in America and other countries and 15 years experience in this country. While it is true that most of our old gardens are stocked with trees of inferior varieties bearing fruit of low quality, yet there are thousands of trees in the Province which not only bear heavily but the fruit is of a quality unsurpassed in the world. It is not uncommon to see some sangtra trees in canal colonies bearing 2,000 to 3,000 fruits each. Sangtra trees in sub-mountainous tracts like Nurpur, Indpur in Kangra District bear fruit of really remarkable quality. There are mango trees which bear immense quantity of fruit of excellent quality and give an income of Rs. 100 to Rs. 300 per tree per year. Some date palms, both indigenous and imported Basra varieties, yield 200-300 lbs of fruit each, and some apple trees are known to bear over a thousand lbs of fruit of excellent quality. These examples can be multiplied. What is necessary to bear in mind is that if in a certain locality ten trees can bear heavy crop of excellent fruit, there is no reason why 10,000 trees cannot be grown in that locality in due course with necessary efforts, facilities and organization which may yield at least a portion of the above income.

Of course, a number of difficulties and obstacles will have to be faced in our work, but some people including intellectual giants are so much obsessed with defeatist mentality, that they are always prone to exaggerate difficulties in the development of certain industries, just as

a poor workman always quarrels with his tools. But for an intelligent nation like a shrewed individual, a little clue is enough to initiate and develop gigantic industries. Every body now knows the vast pineapple industry of Hawaii islands, but it was the existence of just a few pine-apple plants in Hawaii Islands about 40 years ago that provided a stimulus to an American wanderer, Mr. Dole, to take to pine apple industry, and within 20 years this tiny island was exporting annually many crores of rupees worth of preserved pine apple.

What is needed in the Punjab is a concerted action based on some bold policy. Half-hearted measures do not take any nation very far. There is a crying need in this country for the development of industries which would solve the problem of unemployment of millions. It should not be forgotten that an industry most closely allied to Agriculture has the greatest chance of success.

Graduates Taking to Agriculture.
Recent efforts to induce graduates to take to Agriculture through grant of Government lands, have met with a great deal of success in the Punjab. The scheme would have been still more fruitful if the graduates were given facilities to take to intensive or specialised form of agriculture. They may hesitate to take to the plough or to winnow in the burning summer, or find it uneconomical and trying to do manual work, but even the most highly educated and delicate persons would consider it a pleasure to take to gardening operations like budding of plants, spraying of trees to control diseases, to

prune and train the plants to desirable shapes or to preserve fruits or even market their produce. These gardening operations require greater intelligence and less manual work than cultivation of general farm crops, and the graduates can find in gardening greater scope to utilise their knowledge and ability. In fact, if the colony of graduates were to start gardening on an organised basis, they can resort to co-operative packing, grading and marketing of their fresh fruit, preserving their surplus fruit or making by-products of the same. They will be their own chemists, managers, clerks, mechanics and their time will be utilized more fully and profitably. California is now leading the world in horticulture, but it had fallen to the lot of rather delicate, educated and retired men to start this industry. It was the retired businessmen, retired engineers, doctors, bankers, teachers and such other people retired from active life who started gardening more as a hobby but later on found this hobby a paying proposition. Our standard of fruit gardening would also rise when this profession falls in the hands of educated people. It may also be incidentally mentioned that Government can place a larger number of educated men on the same piece of land if put under garden instead of farm crops.

What Fruit Industry Can Mean to Our Province. Development of fruit industry would contribute to the physical, intellectual and economic progress of the people in several ways. While it will increase the income of the Zamindar, it will also enhance the revenue of the Government and provide employment to

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thousands of youngmen. Increased consumption of fruit would improve the health of the nation. It will help in the development of other allied industries like fruit and vegetable preservation, manufacture of juices, squashes, vinegar, citric acid, essential oils and numerous other products. Development of fruit preservation would incidentally give fillip to other side industries namely sugar, glass and tin industries. Just to give a little instance. At present tens of crores of bottles of aerated water and beverages are sold under fanciful names but which contain artificial flavour, colour and saccharine, none of which has any food value. It should not be a difficult matter to substitute real fruit juice and sugar instead of artificial flavour, colour and saccharine in these beverages. It requires no great mathematician to calculate the vast amount of sugar and real fruit juice that will be required for this purpose alone. It will mean more area under gardens, greater income to zamindars, establishment of juice factories, employment to educated people and more consumption of sugar and above all better health to the consumer.

Time does not permit me to discuss possibilities of other fruit and vegetable products but before I close I must say that we might be excused for importing such articles as cannot be manufactured here, but it is nothing short of an insult to our sense of intelligence to see in our markets such imported stuff as orange or lemon squash, tomato juice, ketchup, etc., which can be easily manufactured here at $1\frac{1}{4}$ th the price of imported stuff. Tomato juice, so highly recom-

mended by leading doctors, is sold at Rs. $1\frac{1}{4}$ - per bottle when it can be prepared here at a cost of a few annas. Our own tomatoes do not fetch in certain seasons even Rs. $1\frac{1}{2}$ - a maund. "Let India abound in fruits and let fruit be within the reach of every body" should be the slogan of every well wisher of India whether European or Indian, Congressman or non-Congressman, rich or poor, conservative or extremist. Let us not split hairs on petty matters that hardly affect our life.

TO SUBSCRIBERS OF THE PUNJAB FRUIT JOURNAL

Most of the subscribers of the Punjab Fruit Journal started subscribing to the journal from January 1938. With the supply of this issue their annual subscription expires.

They are requested to remit Rs. 2 by return to renew their subscriptions during this quarter, failing which the next issue of the journal will be sent per V.P.P. of Rupees Two Anna Five (Rs. 2 $\frac{1}{2}$ -).

CHRONICLE OF THE FRUIT WORLD

FOREIGN SECTION

1. Twelfth International Horticultural Congress Berlin. The twelfth International Horticultural Congress opened at Berlin on August 12, 1938. Delegates representing fifty different nationalities were welcomed by Herr Johannes Boettner, Managing President, and also by Herr R. Walter Darre, Reich Minister of Food and Agriculture. India was represented at the Congress by a delegation of three members, namely, Dr. W. Burns of the imperial Council of Agricultural Research, Delhi, Dr. Chaudri of the Punjab University and Mr. K. C. Naik of the Fruit Experimental Research Station Kodur.

The work of the conference was divided between twenty sections, thus ensuring the close co-operation of specialists in different subjects. The conference proved a complete success in spite of international disturbed relations and was wound up by a meeting at the Reich Horticultural Show, Essen, Germany.

2. International Horticultural Centre. The International Agrarian Institute in Rome has, at last, succeeded in affiliating to its various departments a special section for horticulture. This section was only started in 1937 and it has been able to establish connections with almost all major horticultural centres of the world. Attempts are now being made to study, besides other technical problems, economic problems in horticulture. Special studies have been made on refrigeration of fruits and vegetables,

on the utilization of surplus produce and on the effect of measures taken in certain countries, with a view to restricting production. Amongst technical problems, those of the control of pests and diseases of crops are being studied.

3. Frost Causes Havoc in European Fruit Production. As a result of the April frost considerable damage has been done to orchards all over Europe. In the United Kingdom the Bramley's Seedling crop, the most important apple grown in that country, was badly damaged. Prospects for the pear crop are very poor; the important Conference variety being a total loss. About 80% of the Victoria plum crop and from 20 to 50% of the other plum varieties were lost.

Similarly a definite shortage is expected in France this season. The losses were most severe in the eastern and southern parts of the country. Apples, pears and stone fruits have especially been hard hit. In Belgium and Netherlands early fruit was severely damaged, but owing to heavy blossoming of apples and pears 50% crop may yet develop. Germany also reports extensive damage to its fruit crops. Despite reduced crops it is not likely to make heavy imports because of continued exchange difficulties and trade restrictions.

4. Under-production in U. S. A. Apple Crop. The total production of the coming apple crop in U. S. A. is estimated in a Government report at

134,394,000 bushels as compared with 210,673,000 bushels of last year.

5. France Extends Orange Quota.

The French Government has increased the quota of oranges which may be imported into her country from U. S. A., South Africa and Brazil. It is unofficially said that the United States quota is extended in the neighbourhood of about 25,000 quintals or 5,512,000 pounds, (2,756 tons). The French Government has interposed the condition that an importer must agree to export for each quintal (220.46 pounds) of oranges imported, 3½ quintals of potatoes.

6. United Kingdom Continues to Patronise the Palestine Citrus Industry. In spite of prolonged internal disturbances, Palestine exported, in 1937-38 season, citrus fruits aggregating to over 11,390,212 boxes of which about 84% were Shamouti oranges, 1% Valencias, 14½% grape fruit and 1½% lemons.

The United Kingdom received 62% of these shipments and continental Europe 37%; the rest 1% of these were exported to other countries. As regards the exact money value of these exports information is lacking.

7. Island of Jamaica on World Citrus Map. The island of Jamaica expects to have an orange crop of a million boxes in the coming season. So far its chief export market has been New Zealand.

8. Citrus Juice a Valuable Aid to Diabetics. The use of citrus fruits has been found to increase the effectiveness of insulin in human diabetes. Dr. L. E. Detrick of the department of chemistry on the Los Angeles Campus of the

University of California, made this report recently to members of the American Chemical Society at San Diego.

Vitamin-deficiency in the human body eventually results in a condition, where life processes in the tissue cells are impaired with respect to their ability to store and utilise sugar. The function of insulin is to aid the body cells to utilise and burn sugar. But insulin administered to a diabetic patient, whose diet is deficient in one or more of the vitamins, does not act as effectively as in the normal individual.

Recent investigations have shown that vitamins A, B—1, B—2, and C alter the utilization of sugar. Dr. Detrick has studied the effect of vitamin C administered in pure form, and as orange juice and grape fruit juice in clinical diabetes. When the vitamin C in the body fluids of diabetic patients was low, the utilization of sugar by the body was poor. By the administration of 200 milligrams, daily, of ascorbic acid, or vitamin C as orange or grape fruit juice, for a period of fourteen days, the vitamin C content of the body fluid increased, and the utilization of sugar was favourably influenced.

9. Orange Vending Machine. (A Sensational Invention). This invention of a Florida Citrus Grower will shortly be tested in several cities in Florida, under the sponsorship of the Florida Citrus Exchange. It is a nickle-in-slot apparatus designed to make and serve a paper cup of orange juice, automatically from the fruit before the eyes of the buyer. It is hoped that this new device will open a large new outlet for the oranges of that country.

10. Award of Prize for Improved Frost Protection Device. It is recalled that last year President C. C. Teague of the California Citrus Growers Exchange announced a reward of 5,000 dollars for evolving a suitable orchard heater, that may be a definite improvement in frost protection from the standpoint of both public welfare and orchard practice. Many orchard heating devices have been tested and the field of contestants narrowed to a very few. But the selection committee found it necessary to further extend its decision beyond July 1, 1938, in order that the devices already submitted may be subjected to further tests.

11. Radio Broadcast of the Sunkist Fruit Industry. While European Radio Broadcasting centres are humming with war news, it is gratifying to note that the shrewd American nation is making the best possible use of this very useful propaganda device. With a view to popularise the use of Sunkist oranges in the U. S. A. and Canadian territories, daily broadcasts on the uses of Sunkist Citrus fruits were conducted, this summer season, from no less than 18 broadcasting centres in U.S.A. Similar campaigns coupled with boosting with press and poster publicity have been extended to the Far Eastern territories covering Hongkong, Shanghai, Singapore, Japan, Newzealand, Australia and Manila. Because of its territorial proximity to all these places, Manila has been especially selected for broadcasting 'Sunkist fruit' messages.

12. 'Sunkist for Profit' New Motion Picture. This is yet another topical motion picture, just released in the

American territories by the California Citrus Fruit Growers Exchange as an institution. In addition, it constitutes a merchandising course for jobbers, dealers and their salesmen on how to sell fruit. (There is no doubt that such films have great educative value and the Punjab Fruit Development Board authorities will do well to import some positive prints of this and other similar topicals for popularising ways and methods of modern fruit marketing in India.—Ed.)

13. Government Continues to Aid the Citrus Industry of U. S. A. According to fresh arrangements in the fiscal year which started from July 1938, the U.S.A. Government is likely to provide an outlet in the rest of the valencia season for about 2,000 cars for relief purchases and 2,500 cars for encouraging diversion of fresh fruits to the fruit preservation industry.

14. California Fruit Growers Exchange Membership leaps up. The latest available figures indicate that the total membership of the California Fruit Growers Exchange has reached 14,000. The Exchange is a federation of 200 local packing associations. The Growers membership contract is with their respective local associations, each of which in turn is a member of one of the 24 district exchanges, and these district exchanges, strictly speaking, are the real members of the Central Exchange.

15. The Largest Citrus Growing Concern of U. S. A. As a result of 40 years of continuous expansion Dr. Philips Co., of Orlando, Florida State,

now owns and operates over 5,000 acres of grape fruit, mandarines and oranges. Operating on so vast a scale has enabled it not only to have its own packing plant, but to compound its own fertilizers and can its own by-product fruit as well. This concern is considered to be the largest Citrus growing concern in U. S. A. or perhaps in the whole world.

16. Florida leads in Grape-Fruit Production. The United States Department of Agriculture estimates that this season Florida will have 13 million boxes, Texas 10 million boxes and California less than even two million boxes.

17. Tax for Colour Adding in Florida. Besides 5 cents per box as a contribution for the Citrus Advertising Fund, the Florida grower has to pay a royalty of 5 cents per box for the privilege of stamping his fruit 'Colour Added.'

18. United States Becoming Less Apple-Minded. Mr. J. Hansell, state Secretary French Pennsylvania, while advising apple growers of his state for production of quality apples in better packs, passingly remarked as under:—

'Phenomenal development of the Citrus fruit industry in recent years is blamed for an almost 50 per cent drop in the per capita consumption of apples in the United States since 1890.'

19. Some Notable New Varieties of Apples. John R. Magness, Fruit Specialist of the United States Department of Agriculture, has listed the following important new apple varieties:—

Lofi, Milton, Kendall and possibly the Macoun from the Geneva station

(New York State), the Foarot and Whetstone from the Mountain Grove Experiment Station in Missouri, and the Franklin, Ingram, Warder, Downing and Shaw from Ohio Station.

20. An Outstanding Publication on Citrus Entomology. The much eagerly awaited publication of Prof. H. J. Quayle, Professor of Entomology, University of California, entitled "Insects of Citrus and Other Sub-tropical Fruits" has been released and is available from Messrs. Comstock Publishing Company of Ithaca, N.Y., U.S.A., @ \$ 5.00 only. The book is said to be the best, very latest, and most authentic on the subject.

K. L. KOHLI, M.A., L.S.G.D.

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CHRONICLE OF THE FRUIT WORLD

INDIAN SECTION

1. Ganeshkhind Cold Storage

Scheme Extended. The Imperial Council of Agricultural Research has been pleased to further extend the cold storage scheme at Ganeshkhind Cold Storage Experimental Station Kirkee, (Poona), for a further period of three years.

The main results of the investigations conducted in 1936 revealed that fully ripe Nagpur oranges, even if not completely yellow, can be kept in good condition for three months at 40° F. without any appreciable wastage, whereas ripe Malta oranges can also be kept at the same temperature.

It was found that wrapping of Alphonso mangoes with tissue paper spoilt the ripening power after cold storage, and that rice straw and wood-wool used as packing material did not affect the Alphonso fruit, while in cold storage, but spoilt the subsequent ripening to a considerable extent.

It has been found that a well ventilated crate of the size of 24" X 12", capable of holding about 100 Alphonso mangoes, is a suitable kind of package for cold storage. Close packing with rice-straw, wood-wool, etc., and wrapping of individual fruits should be avoided, using only a light wadding of the packing material to support the fruit and minimise bruising.

It has been discovered that seed-potatoes (Italian) can be kept in good

condition without sprouting at 35° F. for 12 months without any appreciable loss in the germinating power.

*2. Cold Storage of Fresh Fruits at Lyallpur. Preliminary experiments at the cold storage experimental plant, under the direction of the Fruit Specialist Punjab, have indicated equally decisive results as those obtained at Poona. The salient results are summarised as under:

Grapes: The varieties Munaqa and Bedana were both subjected to each of the four temperatures viz. 32, 36, 40, degrees F and room temperature. The preliminary observations show that Munaqa variety kept in proper condition for four weeks and the Bedana variety for six weeks after storage—the most suitable temperature in both cases being 32 degrees F.

Citrus Fruits: (a) Valencia late variety of Malta was in excellent condition on June 30, 1938, i.e. four months after storage. Malta common variety kept well for about four months; Saville for three months and Blood-red for 2½ months only, (b) The temperature range of 36-38° F proved best for all the varieties. (c) Large sized fruit kept better than the small sized fruit, and wrapping the fruit with butter paper proved beneficial in preserving the colour and brilliancy of the skin of all varieties under trial. The

*This work has been done under a scheme jointly financed by the I.C.A.R. and the Punjab Government.—Ed.

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results have conclusively shown that Valencia late malta is the best keeper and Blood-red the poorest of all. Sangtara oranges from Lyallpur and Pathankot kept well only for 1½ months at 36-38 degrees F.

3. Fruit Nurseries of the Punjab Agricultural Department in Full Swing. Production as well as sale of fruit plants in the Government nurseries at Lyallpur, Montgomery, Jullundur, Gurdaspur, Gujranwala, Sargodha, Muzaffargarh, Karnal, and Samli have considerably increased as a result of the special grant of Rs. 47,000 from the Government of India Rural Development grant for 1935. These nurseries are spread all over the province and cater for their respective localities with great economy and efficiency. The magnitude of sales from these nurseries may be seen from the sale figures for the last three years given below.

Type of Plant	1935-6	1936-7	1937-8
Ever green (Citrus & mangoes mainly)	3,861	13,906	21,785
Deciduous (peaches, plums, grapes etc.)	2,838	6,959	12,353
Total	6,699	20,865	34,138

Out of 34,138 plants sold by the government nurseries dotted all over the province, Lyallpur nursery alone supplied about one-half of the total number.

4. Glacier Products in the Indian Market. Messrs. Glacier products conti-

nue to make an all-round steady progress and Glacier squashes and juices have proved to be exceedingly popular in the Indian markets. In this marketing expansion programme Messrs. Spencer & Co., Delhi, the Chief Selling Agents of the firm, have played no mean part. In the very first year of its working the factory has produced about 30,000 bottles of citrus squashes and Mr. Mehar Chand Mahajan intends to considerably increase the output in the coming year. We are pleased to learn that Mr. H. C. Battanagar, the Fruit Chemist of the factory—a Lyallpur qualified hand—is very ably acquitted himself in this hard pioneering work.

5. India's Cocoanut Industry Threatened with Ruin by Ceylon. Enhancement of Duty urged: Rao Bahadur Dr. Kunjan Pillai, Chief Secretary to the Travancore Government, in a recent interview to the Associated Press, has invited the attention of the Government of India to the absolute and immediate necessity for the protection of the Indian cocoanut industry against competition from Ceylon.

The imports of copra into India from Ceylon rose from 70 tons in 1930, to approximately 50,000 tons in 1936. A more or less correspondingly phenomenal increase in the import of cocoanut and cocoanut oil had also been recorded during this period. The result of this dumping was a calamitous fall in prices. The price of a candy (645 lbs.) of copra fell from Rs. 112, in August 1928, to Rs. 35 in 1934, and at present it ranges from Rs. 35 to Rs. 40.

This situation has threatened the forced neglect and ultimate extinction of cocoanut cultivation in Malabar, where it forms the chief money crop of about $\frac{3}{4}$ of the population of that tract. This matter is of vital importance to Travancore State inasmuch as about 38% of the total cultivated area of cocoanut in India is in Travancore, and that about one-fourth of cultivated area in the State consists of cocoanut gardens. The only plausible solution suggested to meet the situation is that the present duty on the import of cocoanuts be enhanced from Rs. 40 to Rs. 100 per ton at least.

6. Assam Fruits for the Calcutta Market. Mr. L. K. Handique, Senior Marketing Officer Assam, has prepared a comprehensive scheme for the marketing of Assam Fruits, especially oranges and pine-apples, on commercial basis, in the Calcutta market. (Assam pine-apples are definitely amongst the best in the world and equal in quality easily to the best Singapore varieties, while Assam oranges are as sweet as those from Nagpur, though not so attractive in appearance.—Ed.)

7. Steady Increase of Lime Acreage in the Bombay Presidency. It appears that the use of lime as an item of diet is becoming increasingly popular in the Bombay Presidency. The area under lime in 1937 was 2,612 acres as against 1,263 acres in 1925, (an increase by about 107%). Figures worked out by the department of agriculture Bombay indicate that the cultivation of lime has been found to be very profitable. (The net profit in cultivation of Kagzi limbu in Bombay Province comes to Rs. 280 per acre per year—a figure that can

compare favourably with any other cultivation.)

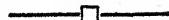
8. A New Method of Candyng Fruits. In the Fruit Preservation Laboratories at Lyallpur, the method of Atkinson and Strachan (Fruit Prod. J. Oct., 1936), of candyng fruits in an invert sugar, by the addition of appropriate amounts of citric acid in the cane sugar syrup, (instead of using a syrup containing glucose and cane-sugar) has been tried. The product obtained by this method is much superior to that obtained by using cane sugar syrup alone. This is very important, as commercial glucose syrups used in foreign countries are not available here, and the glucose available in this country is very expensive for any successful candyng on a commercial scale. The invert sugar, (mixture of glucose and fructose) produced in the cane sugar syrup by the above method, dispenses with the use of glucose in making the desired syrup for candyng.

9. Spraying Machines Manufactured in India. Prior to the outbreak of the War in 1914 most of the sprayers in India were imported from Germany and other continental countries. In 1914 when war broke out, the supply of sprayers from Germany was abruptly stopped, and the Provincial Agricultural Departments here in India adopted measures to arrange for manufacture of the spraying machines locally. One of the pioneering firms of those times which has stood the test of time is the Standard Furniture Co., Ltd., Kallai, (Malabar). This firm is very extensively patronised by the departments of Agriculture in Southern India. It is reported that more than 2,000 of their sprayers are

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already in use that side. We have no hesitation in recommending this firm to the readers of the journal for meeting their requirements regarding spraying machines and other appliances regarding control of insect pests and diseases.

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A NEW METHOD OF PROPAGATING THE KAGHZI NIMBOO (CITRUS AURANTIFOLIA SWINGLE) AND ITS BEARING ON THE DEVELOPMENT OF LIME INDUSTRY

By

DR. SHAM SINGH, B.Sc. Agr. (Punjab)

Ph.D. (Bristol) F.R.H.S.,

Assistant Horticulturist, Lyallpur.

The Kaghzi nimboo (sour or Kaghzi lime) is cultivated in India from time immemorial. The method of propagation has largely been from seed. The seedlings, as a rule, considerably vary with regard to the 'grade' and the amount of crop borne by them. Sometimes even seedless forms are met with, which evidently originated as chance seedlings. The multiplication of the most desirable strains and varieties has been and is being done by layering and "gootee," which are the only methods considered by nurserymen to be applicable to the vegetative propagation of this plant. Both of these methods are tedious, expensive and wasteful and their practical utility is very limited on account of the fact that only a very small number of nursery plants can be produced from a given individual.

It is thus obvious that multiplication of the outstanding varieties of Kaghzi lime is a serious problem even to-day, and anything done in the direction of

facilitating an easy and quick perpetuation of these varieties should prove a boon to our citrus industry. With this aim in view, preliminary experiments on the propagation of Kaghzi lime by budding, as explained and discussed in this article, were started during the last season, by the Fruit Section at Lyallpur. The results obtained are so encouraging as to leave little doubt about the efficacy of this method.

Method of Propagation. The selection of scion trees and bud wood, the removal of buds and their insertion into the stock seedlings, and the wrapping of the inserted buds and their after-care in the nursery row have already been explained in detail by the author in an article on the propagation of malta oranges published in Vol. 1, No. 2 April 1937 issue of this journal, Pp.37-39 (Urdu section). All the necessary details published in that article apply equally well to the propagation of Kaghzi lime but with one important difference, which

lies in the removal of buds from the bud sticks.

Out of citrus fruits, the buds in case of the malta, sangtra, lemon and pomelo are rarely associated with the presence of thorns, and those selected for budding are invariably without them; but in the case of grape fruit, Kaghzi lime and sweet lime, however, the reverse is the rule. In propagating malta and sangtra varieties, the Indian nurserymen use such buds as are removed from the bud sticks without any trace of wood, but the American nurserymen always employ buds with a thin slice of wood on their under surface.

The difference in the two practices prevalent in these two countries and elsewhere appears to be purely conventional, as both the methods have, in actual practice, given equally good results. The prevalence of the method of inserting the buds without any trace of wood in budding operation has, however, illusioned the Indian nurseriesmen in that the insertion of buds with wood will not give the desired results. This belief has been proved to be without any foundation by actual experiments conducted at Lyallpur. Furthermore, this belief has resulted in the discarding of thorny buds for budding work. Propagation by budding of fruit plants like grape fruit, Kaghzi lime and sweet lime, which are thorny in character and as such have the least tendency to produce thornless shoots, is thus regarded by our nurserymen to be out of question. This fallacy is largely responsible for the neglect of our lime industry. Propagation by layering and "Gootee" has not been

commercially adopted, as these methods are tedious, expensive, slow and wasteful. The multiplication of the outstanding varieties, therefore, could not be taken up to any appreciable extent, and the cultivation of the Kaghzi lime has thus remained very limited and restricted to only such localities which could grow it successfully, either as a seedling or on its own roots as a layer. Even in these so called favourable localities the Kaghzi lime is highly susceptible to diseases and extremes of weather.

If, however, some rootstock species are found to impart the necessary hardiness against diseases and seasonal exigencies of the weather, it may be possible not only to improve its cultivation but also to extend the same to the South-Western plains of the Punjab, where it does not thrive so well on its own roots or as a seedling, as it does in the sub-mountainous tracts. The successful budding of Kaghzi lime, tried probably for the first time in India, opens up a new vista of possibilities for the improvement and extension of the cultivation of this fruit. It may not be out of place to mention here that experiments in this direction are being initiated at Montgomery, as a result of the facilities provided by the Imperial Council of Agricultural Research, India.

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CITRUS BUD SELECTION

By

DR. A. A. KHAN, B.Sc. Agr. (Punjab),
Ph.D. (Bristol), Fruit Section, Lyallpur.

Standardisation of varieties is a fundamental principle in commercial citrus growing. The varieties can be standardised by careful and diligent selection of scion buds, as it is only through this source that the inherent qualities of a variety are transmitted to the off-springs. Unfortunately, however, very little attention is paid to this fact which is of such a vital importance and on which the ultimate success or failure of the enterprise depends. The tendency of the majority of nursery men is to select material from trees most resourceful in supplying maximum number of vegetative buds without taking into consideration whether or not the variety is true to type, prolific and regular in bearing. Consequently, in most cases, particularly when the plants are obtained at cheap rates from unreliable sources, the resultant trees at the time of maturity either turn out to be quite unproductive or produce small crop of inferior quality. The importance of selecting right scion material for propagation purposes cannot be over-emphasized; and a brief account of the method is given below as a guide to those interested in the subject.

In order to ensure the supply of buds of a desirable type, an exhaustive survey of the orchard or orchards should be made and the trees true to type and of outstanding merit with regard to

health, vigour, cropping capacity, evenness of fruit, quality of fruit and regularity in bearing be marked and plantation maps prepared showing the exact location of such trees. This information can be collected from the record of the individual trees maintained by growers, supported by the observations at the time of fruiting; and if such information is not available, the same can be collected by keeping such trees under observation for a couple of seasons, before these are included in the list of trees of outstanding merit. For each true to type tree, that appears to be promising, a separate history sheet should be started and the above mentioned points recorded in detail at the time when the crop is on. Each individual limb or branch on the tree should be examined and the one producing fruits of undesirable type, whether in quality or yield, should be discarded for propagation purposes. Only the limbs or shoots producing fruits true to type and in abundance should be selected and labelled, and a note to the same effect recorded in the performance register. The precaution of selecting each limb or branch individually from a promising tree is an extremely important point in the process of bud selection, as has been emphasized by prominent horticulturists, especially A. D. Shamel and his associates, that, unlike

most other fruit trees, if citrus trees are propagated by vegetative means, it is not always necessary that the resulting trees come true to type. Their findings are that any one or all the external characters of citrus trees are subject to variation and that bud variations have been and can be perpetuated by budding. They have gone so far as to attribute differences in size, shape, colour, seediness, juiciness, quality and other characters of fruit, the habit and growth of the trees and even the volume of the crop to bud variations or bud sports. Although these claims have been questioned by some other scientists, there can be no doubt that bud variations do occur in citrus. These bud variations may be desirable or undesirable, therefore, while labelling shoots, those possessing

undesirable bud variations should be eliminated, when making selection of buds for the purpose of propagation. The writer has himself seen a tree of common malta orange, bearing on one of its branches, fruits of inferior type with distinct different morphological characteristics, possessing navels at their apices and a very thick skin as compared with the rest of the crop, which was quite representative of the variety, the fruit in this case being without any navel with thin shining skin. It is evident, therefore, that if the buds were taken from this tree without discarding the shoots bearing fruits of variable type, the propagated material would have given rise to two types of trees; those propagated from true to type buds would possess desirable qualities, whilst

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others propagated from variable buds would produce a different type of fruit of inferior quality. Root-stocks, soil, cultural and environmental conditions being equal, the scion material selected

on the lines suggested above would, in most cases, not only give rise to true to type trees but also result in improved yield and fruit of good quality.

VALENCIA LATE ORANGE AS AN INTRODUCED VARIETY
IN ASSAM

By

RAJENDRA KUMAR PRADHAN

India is going ahead in the direction of occupying its rightful place in citrus products. Large plantations are coming into existence. The variety known as Valencia Late should find a place in each citrus orchard because of its wonderful characteristics.

The Fruit of Valencia Late & Its Keeping Quality. It is of medium size, slightly oval in form and very beautiful in shape. The skin is rather thin and of strong texture; the flesh is firm, crisp, and of very fine grains. The fruit abounds in juice, has nice flavour, is heavy and keeps in excellent condition even for about 2 months after picking, stands rough transpotation and can be sent to any part of India where it can be marketed at high prices.

The season of Valencia Late Orange. It is practically the only orange ready for market, for the period from April to June, when all other varieties of oranges are not available and when the fruit prices are on the highest level. The tree is a vigorous grower; it comes into bearing in the 3rd or 4th year after

planting, and is notably prolific. It blooms at the same period as other varieties, usually in February, but matures its fruits in April next year. The tree, however, puts out blooms and sets a normal crop while carrying the current ones, which hang on the tree till May or June.

Climate of Indian Hills & Plains. The trees having fruited here equally well like other standard oranges, it is now generally known that India can produce this orange with ordinary care as abundantly as any other orange. A Valencia late orange is truly tropical in habit and entirely hardy in all parts of this country, it can, with a fair amount of success, be grown in all soils and elevations upto 4500 ft. from the sea level.

The Tree of Valencia Late Orange. The tree of Valencia Late orange is usually propagated by the process of budding on a healthy stock of Jamburi, which is regarded as the hardest citrus tree for successfully planting on both the soils of hills and plains. It grows rapidly, attaining in many cases the

height of about 5 feet from the ground in a year, bears fruit in the third or 4th year of planting and reaches its standard height in the 6th or 7th year, according to the richness of the soil. The tree is almost thornless, of spreading habit, and of a moderate height. The plant being grown on the body of a hardy tree, is deemed resistant to common diseases.

Comparison of Income. Valencia Late

Orange tree bears from 500 to 1,000 fruits. The price obtained for a hundred fruits of Valencia Late will be 2 to 3 times more than the price obtained for other early ripening oranges. Considering the vast difference of income between early and late ripening oranges, planters in India ought, to their own advantage, waste no time or money in the cultivation of other early ripening oranges but give a fair trial to this new late ripening orange instead.

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FRUIT FALL OF CITRUS AND ITS CONTROL

By

DYAL SINGH JOHAR, M.Sc.,

Mycological Assistant, Lyallpur.

Dropping of premature fruits of citrus plants like Malta, Sangtra, etc., is very common in the Punjab during the months of June, July and August. Among the many causes, to which this phenomenon is attributed, is a disease brought about by the fungus *Colletotrichum gloeosporioides*. The disease can be recognised by the fruits, which first change their colour from yellow to brown or even to dark brown in seriously affected cases and ultimately drop. The fruits that drop prematurely are altogether worthless; in fact, they should all be collected and buried under ground. In its early stages the fungus attacks the leaves, which first wither and then die. From these, the disease travels to the healthy branches, and gradually to the whole plant which, owing to the loss of leaves, fails to manufacture sufficient amount of food and finally loses its vitality. Minute black fruiting bodies (acervuli) of the fungus appear on the young twigs which wither and ultimately die.

Under humid conditions the fungus flourishes rapidly forming pinkish masses of spores, which ooze out from the acervuli and then cause further infection.

Much of this economic waste can be checked, if the fruit growers adopt the following necessary control measures.

(1) The dead twigs including six inches of green portion below the point where drying has started should be cut after the fruit is picked. All cut branches should be carefully collected and burnt. The cut ends of big branches should be coal-tarred. The affected leaves should be collected and burnt. The plants should be sprayed with Bordeaux mixture and iron sulphate solution once in February and then in June.

✓ The Spray mixture can be prepared by the following method:—

Formula

Copper sulphate ..	4 lbs.
Iron sulphate ..	
(ferroso)	4 lbs.
Unslaked lime ..	8 lbs.
Water ..	50 gallons.

Dissolve copper sulphate and ferrous sulphate either together or separately in about 10 gallons of water, slake the lime and add more water to make the solution to 40 gallons. Pour the lime through a strainer and add the solution containing copper sulphate and iron sulphate to the lime solution, stirring the mixture all the time while pouring.

The iron sulphate is precipitated and serves as an adhesive; it also checks mottling of leaves to a great extent.

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**INSTRUCTIONS REGARDING THE IMPORT OF FRUIT PLANTS FROM
FOREIGN COUNTRIES**

By

S. BASANT SINGH, B.Sc. (Agr.)
Fruit Section, Lyallpur.

Complaints have been received by the Fruit Specialist from some prominent fruit-growers that they have had considerable difficulty with the customs authorities at Indian sea-ports, when importing fruit plants from foreign countries. The unnecessary delay caused in the clearing and forwarding of consignments of plants from the port not only considerably delayed planting but also resulted in a high percentage of mortality. Such occurrences mean a great deal of financial loss to the growers.

We cannot blame the customs authorities for this trouble. It is generally the result of failure by the supplier to fulfil certain conditions required under rules on the subject. If the indentor knows these rules, he can instruct the suppliers accordingly, while placing his orders for the plants.

The Department of Agriculture, Punjab, imported a large number of fruit plants from England, America, Japan, etc., during the two last winter seasons and had to face similar difficulties, firstly at the hands of the customs people at Karachi in connection with fumigation, and secondly with the railway departments in their booking consignments by passenger trains. On the strength of the experience gained in these two years,

some instructions on the subject are given below, which, if followed, will remove all difficulties regarding clearing and forwarding of such consignments from the port of delivery.

1. According to Government of India orders, plants imported after the 1st February, 1937, will not be permitted to pass through customs, if they are not accompanied by a certificate from the suppliers stating that the plants are free from injurious insects and diseases. The suppliers should, therefore, be instructed to send the necessary certificate along with the plants to the shipping agents at any Indian port to which the plants are booked.

2. It will be necessary for the suppliers to state what kinds of plants are sent as there are greater restrictions on the import of citrus plants. In this connection please refer to instruction No. 10.

3. The suppliers may be instructed to send the shipping documents to the shipping agents whose names should be clearly stated, by Air Mail, so that they may see to the necessary arrangements before the arrival of the steamer carrying the plants.

4. All plants are fumigated at the Indian port by customs before despatch to destination. The fumigation Chamber

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at Karachi is of a small size and plants packed in cases 9' X 2'-6" X 1'-9" can only be easily fumigated without disturbing the contents. No packing cases more than 8' long and weighing 5 mds. or over can be booked per passenger train. A convenient size for packing conforming to all the rules is 8' X 2'-6" X 1'-9", and its weight should not be 5 mds. or over. This should be clearly brought home to the nurserymen.

5. The Agricultural Department has been importing plants, from England and America at Karachi, and from Japan at Calcutta, through the following shipping agents who may be considered as reliable companies to deal with:

- (i) Messrs. Mackinnon Mackenzie & Co., Mcleod Road, Karachi.
- (ii) Gladstone Wyllie & Co. 4, Fairlie Place, Calcutta.

6. Orders for plants should invariably be placed with the nurserymen concerned as early as June and July, and they should be instructed to despatch the plants from their nurseries by early December, so as to reach India in time. The name and address of the shipping agents to whom the plants are to be booked should be clearly mentioned.

7. Cost of plants, freight and other charge are generally paid by the shipping

agents at the port of delivery. It is advisable to advance sufficient money to the shipping agents to meet all necessary charges including cost of plants, freight, packing, duty, clearing and forwarding charges, railway freigh, etc. It may be necessary at times to pay the cost of plants in advance direct to the nurserymen.

8. The address of the indentor and the name of the railway station to which the plants are to be booked should be stated clearly.

9. Instructions regarding the receipt and depatch of plants by the shipping agents should be very clear.

10. No citrus plants and cuttings of such plants shall be imported into British India unless, in addition to the general certificate required under instruction No. 1., they are accompanied by an official certificate that they are free from the Mal de Secco (Deuterophoma tracheiphila) or that the disease does not exist in the country in which they were grown.

11. No plants shall be imported into British India by air.

12. No plants shall be imported into British India by means of a letter or sample post.

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BOTTLING FRUIT AT HOME

By

N. F. D.

People seem to have an idea that bottling fruit is a very expensive and tedious business. There is really nothing complicated about it, and, if done in the way that I suggest, the fruit will keep its original delicious flavour. Besides, a great consideration is the cost, which is far less than any imported bottled fruit. Now that fruit is so plentiful in the Hills, those who have a place to store even half a dozen bottles, will find it quite worth while to do so. The initial outlay will be money really well spent. It is advisable to purchase jars with a rubber ring and a glass top as well as a metal screw-top. It is necessary to have a thermometer (centigrade), which is not so very expensive now, and does away with guess work.

The Process. Only fruit and vegetables that are perfectly sound should be bottled. Fruit, such as apples and pears, must not be touched with a steel knife. The colour will be spoilt unless silver knives are used. Apricots, cherries and other stone-fruit may be halved and stoned, but I do not advise peeling. So often the appearance of the fruit is spoilt by allowing it to pulp. Place the fruit carefully in the jar, trying to get them as much one size as possible. Fill the jar with syrup but not right up to the top. This will prevent the fruit

from floating. Next lay on the rubber band, then the glass top and lastly the metal top, and screw this down tightly. Place the jar in a large pan, packing it round with straw to keep it in place. Fill the pan with enough cold water to cover the bottles, place a stone on the lid of the pan and bring the water to the required heat. Different degrees of heat are required for different fruits, and the table given below will be found practicable.

Take the pan off the fire when the required heat is reached, leaving the bottle in it for a quarter of an hour. Screw the metal top tighter as you take the bottle out of the water, and store it in a cool dark place.

Of course only fruits, which require the same degree of heat, must be "cooked" together, and the degree of heat must be kept even, not boiling one minute and simmering the next.

Plain water may be used for bottling vegetables and fruit but I prefer syrup for the latter.

The Syrup. Use a pound of good white sugar to each pint of water and boil quickly with the lid off. Leave till quite cold before adding to the fruit.

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Table for Bottling Fruit

Kind of Fruit	Degrees of Heat	Time	
Cherries	90 (Cent).	25	min.
Apricots and Peaches	90 "	25 30	"
Plums and Greengages	85 "	25	"
Strawberries	75 "	75	" Must be brought very slowly to the degree.
Apples and Pears	100 "	40	"
French Beans	100 "	1 3/4	hrs. Water with salt
Peas	109 "	"	Water with salt and little sugar.
Tomatoes	70 "	25	min.

— "Statesman."

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SOME HINTS ON VEGETABLE GROWING IN THE PUNJAB

By

CH. KARAM RASUL,

Asstt. Professor of Agriculture, Lyallpur.

and

S. GURBACHAN SINGH,

Teaching Assistant, Lyallpur.

The important role that vegetables play in the human diet is seldom appreciated. Recent researches have, however, shown that vegetables not only contain such essential elements as potassium, phosphorous, iron, calcium and sulphur in fairly large amounts, but the form in which these valuable salts are present in them is readily available to the human body. They also contain vitamins, the substances which are absolutely essential for the normal development and growth of the body and in imparting immunity to it from attacks of certain diseases. In addition to the above, vegetables neutralise acidic reaction in the body and act as a laxative.

Vegetable growing at present is generally confined to and around big towns and cities in the province. It can also be made profitable in villages which are well connected with towns and where both water supply and manures are sufficient. A part of the produce can be consumed in the villages and the surplus can be transported on lorries to the nearest towns. Even in the remotest areas, where no such means of communication exist, growing of such crops as chillies, garlic, onions, sweet potatoes, potatoes, coriander and fennel which

can be safely stored for sometime, can be taken up to some extent.

In addition to an adequate water supply and plenty of manure, vegetables prefer a loam soil. Success in vegetable farming, like crop raising, not only depends on suitable soil, good cultivation and manuring but also on the use of sound and pure seed of improved varieties. Selection of seed is, therefore, of first rate importance, and all the time and money spent on it is well repaid later on. In the plains of the Punjab production of seed is only possible in the case of some common local types and only a very few foreign varieties of vegetables, while the seed of most of the others has to be obtained from localities where it can be raised. The following information regarding the production and procuring of seed of winter vegetables will be useful for the Punjab farmers.

Cauliflower. Locally produced seed of cauliflower is useful for raising an early crop; but for the late crop seed should be imported.*

*Comparatively cheaper and reliable seed of foreign varieties of vegetables can be obtained from M/s. Pestonjee P. Pocha & Sons, Poona and M/s. Sutton & Sons Ltd., Russell Street, Calcutta.—Ed.

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Tomato. Seed of tomato can be produced here, but the crop raised from locally produced seed decreases in yield. It is, therefore, advisable to renew* the seed after every two or three years.

Carrots and Turnips. Foreign varieties of these vegetables are more delicious. They should, therefore, be grown along with local varieties. Their seed, however, cannot be produced here and has to be imported* every year. It is not possible to get a very early crop from imported seed.

Peas. The seed of local peas is small in size but they are useful for raising an early crop; as they ripen early, they cannot be used for the late crop. For this purpose imported varieties which are bigger in size and remain

green for a longer period are useful. Their seed can be raised here but deteriorates in quality after a year or two. It should therefore be renewed* in alternate years.

Spinach and Fenugreek: Kandiari Palak and Qasuri Methi are more delicious than local fenugreek and spinach. There is no difficulty in raising their seed locally.

Potatoes. The Department of Agriculture, Punjab, has been trying imported varieties of potatoes in the hills for a number of years. Some of these varieties are very promising.

For further information regarding potatoes, reference may be made to the Botanist for Oil-seeds, Punjab Agricultural College, Lyallpur.

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DEMAND FOR DRIED PAPAW FROM OVERSEAS

The Director of Agriculture, Punjab has forwarded in original a letter from Messrs. Carter Cummings, Manufacturers of Pharmaceutical Products Toronto, Canada, to the fact that they are interested in securing large supplies of Dried Papaw or Papaya Juice from the Indian territories. The letter runs as under:

"We are interested in securing large supplies of Dried Papaw or Papaya Juice and write to ask if you will kindly advise us if the Papaw or Papaya Tree is commonly grown in your territory, also whether any of the dried juice, commonly known as Papain, is prepared and shipped from your territory. If so, when you reply, will you kindly send us the names and addresses of parties who engage in this business. We are interested in securing dried papaw juice and also desirous of entering into correspondence with large planters, who are in financial position to open from 50 to 150 acres.

For your information, when being produced, commercially, the papaw seeds are taken from healthy ripe fruit; fruit used for this purpose, to be of the female type and unscored, and by the latter we mean that the fruit used for collecting seeds should not have had any of the juice tapped or taken from it, as seeds from tapped fruit are not as vigorous as seed taken from untapped fruit.

The seeds should be mixed in with,

preferably, wood ashes and allowed to dry in a cool dry place.

It is advisable and preferable to start a nursery, to start the plants rather than planting the seed out in the field, and when the young plants have reached a height of about 8 to 10 inches, they can be transplanted to the desired location.

It is, of course, preferable to transplant when there is rainfall or wet days ahead, so the young plants get a good start.

Since the fruit from the female tree is used only for securing the "milk" or juice from and since there are usually more male than female trees, it is best to plant about 3 young plants and then later on, when they have sufficiently grown to indicate which is the male plant, these latter can be pulled out.

In many places the planting of papaws for commercial purposes, is looked upon as a "catch" crop, the young plants being planted in between other plants, such as young cocoanut trees, etc., so to afford income while the cocoanut trees, for instance, are growing.

As a rule, the papaw trees, where grown for commercial purposes, are good only for about three years after first tapping, although the tree continues to remain perfectly healthy, and when situated in highly suitable spots, as regards richness of land and adequate

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rainfall, will continue to give fairly good yields; but where plenty of suitable land is available, we have found it pays to establish new growths of trees and to do this annually or semi-annually, so there are always young trees available for tapping.

The papaw thrives best where soil is rich (not "clayey") and fairly light and where good rainfall exists, but while it requires goodly rainfall, there must be good drainage,—in other words, to use a "native" expression—"the papaw, he don't like wet feet."

In order to profitably engage in the business, it is essential the daily rate of pay be very low as paid to common field workers.

For the most part, work can be readily done by female workers, and this is particularly desirable where the rate of pay is lower than that for male labour.

The erection of suitable driers is inexpensive and can be prepared in a small way as a "try out" and more suitable driers can be erected when the production warrants.

We are prepared to give complete instructions as to the preparation and handling of the juice, etc.

It has been found, where a number of native labourers live on, or around a large estate, and have an acre or more

of land available around their domicile, they are induced to plant the papaw trees and they then can "tap" the unripe fruit of the female tree and properly gather the same and take it to the central drier nearby.

We are desirous of entering into correspondence with only reliable persons and those whose financial status is such, they could be counted upon, to carry on the work.

We would greatly appreciate your favouring us by doing everything you possibly can to bring the foregoing to the attention of all those you consider would be interested.

Will you kindly also favour us by taking a few snap shots of the papaw or papaya trees commonly found in your vicinity and if there are several varieties of fruit will you send us pictures of each.

There are, as you probably know, several varieties of fruit, from the round fruit, about 3 or 4 inches in diameter to the very long variety. We have found the former to be most suitable since they are harder, give off "milk" for a longer period, etc.

We may add that in tapping the fruit, only the green, unripe fruit is "tapped" and of the female tree."

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HORTICULTURAL KNOWLEDGE FROM FAR AND NEAR

1. Total Nitrogen in Developing Flowers and Young Fruits of Valencia Orange. It is essential to know at what stage of growth the plants put the greatest demand on their roots for the supply of nitrogen. Cameron & Appleman carried out this type of work in America. They collected flowers and young fruits from four 12 years old trees at weekly and bi-weekly intervals from March 6th to June 24th. The data collected indicated a gradual increase in both the dry weight and the absolute nitrogen in blossoms and young fruit during March and April and subsequently a very rapid increase during May and June. The percentage of nitrogen to dry weight, however, showed a slight but consistent decrease during the whole period. From previous evidence it seems that blossoming and shedding of young fruits results in actual diminution of the nitrogen content of the tree as a whole. This is supported to some extent by a comparison of flowers which developed at different times during the blossoming period, namely, March 1st, 8th & 15th. Those developing earlier were distinctly richer in nitrogen than the later flowers. Observations indicated that seasons of heavy bloom are those of heavy "June drop" and Light crops, the size of the crop being inversely proportional to the amount of blossom. The authors consider that it is reasonable to suggest that the determining factor is the supply of nitrogen and it would appear that it is minimum in the tree during May.

2. Citrus Returns Show Value of Wind Protection. Wahlberg from California summarised averages of the returns of 20 otherwise comparable protected and unprotected orange orchards which showed an income of \$ 445.45 per acre for the former against \$ 271.34 per acre for the latter. Other results were—protected average yield 328 field boxes per acre, unprotected 214 field boxes; grades of protected fruit, 1st grade 117 packed boxes, 2nd grade 73, 3rd grade 20; unprotected fruit graded, 54, 52 and 22 respectively. With lemons the returns were protected \$ 536.89 per acre, unprotected \$ 324.64; yield protected 292 field boxes per acre, unprotected 197.0. Grades protected 63 boxes 1st, 63 2nd, and 30 3rd; unprotected 311 1st, 43 2nd, 26 3rd grade fruits.

3. Thinning Grapes by Chemical Methods. Thinning table grapes by removal of bunches and berries is a matter of common practice but is a costly one. The grapes normal flowering period is one week, with a minimum intensity in the first and last days of the period and a maximum intensity on the 3rd day, the intensity being the same at any given time for all parts of the bunch. Palieri at Maccaresi, near Rome, tried the effect of spraying the bunches 3 to 4 times during the flowering period with a chemical solution—divadura (grape thinner)—in the hope that flowers which were open at the time would, whether fertilised or not, become abortive and fall off and

that the unopened flowers would remain unaffected. It is claimed that his success was complete. Not only was this chemical thinning uniformly distributed, but it proved very much cheaper than thinning by hand. The following advantages are claimed:—Greater uniformity of berries in the bunch; increased length of the main stem of the bunch; increased length of the peduncles of individual grapes as a result of the atrophy of those destroyed; slightly earlier ripening; increased size of individual berries and hence of bunches.

4. The Discovery of Inter-sterility in Apples and Pears. Kobel and Steinegger have discovered that certain varieties of apples and pears are inter-sterile. All these varieties are diploids possessing fertile pollen, and it has been shown that failure to effect cross-fertilization is due to cessation of growth of the pollen tube, when not more than one quarter of the way down the style. It is noted, in addition, that all apples and pears are self-sterile, which is also associated with the failure of pollen tubes to reach the ovules, and that a number of triploid varieties produce sterile pollen.

5. X-Ray Machine Shows Inside Character of Citrus Fruits. Good fruits with heavy juice appear dark on the screen; immature fruits, fruit low in sugars; frozen or granulated show up light. Any condition causing a breakdown of the cells of the fruit is visible on the fluorescent screen. The machine is a production of the General Electric

Corporation of Chicago. It is still in the experimental stage.

6. Commercialization of Hybrid Vigour in Tomato. The trials discussed were carried out at Research Station Palmerston with four tomato varieties—Large Red, Early Cluster, Kondine and Sunrise. The varieties were crossed with one another both ways and, thereafter, the resulting plants were treated as in commercial practice. With certain of the crosses a higher yield was obtained than with either parent, and failing that, the trend was towards the earlier maturity parent. The increased yield and earlier maturity obtained in some cases appear to warrant the cost of producing hybrid seed for commercial purposes. Crosses between dissimilar varieties seem to result in a greater measure of benefit than between varieties of greater similarity. This trial having shown the possibilities of the utilization of hybrid Vigour, the next step will be to consider those varieties which, when combined, result in the greatest measure of benefit.

7. A Fruit Circumeter. A circumference gauge for measuring fruit called a "Circumeter," combining the features of cheapness, accuracy and convenience, has recently been devised by the authors at the Citrus Experimental Station Riverside California. It is claimed that it is more accurate than calipers, on fruits that are not round, and quicker than plain tape measurements, on all fruits. It can be used with one hand and measurements made very rapidly.



8. Potassium in Citrus Leaves and Fruits. The study of the potassium content of leaves and fruit of citrus suggests that, while it is difficult to give any definite answer in the case of leaves, potassium in the fruit is increased by potassium fertilisation of the soil. Whether the quality of fruit is affected, is uncertain.

✓ 9. A Method of Killing Standing Trees. The method proposed avoids the felling of the trees, a process which often causes damage; particularly in the case of shade trees over such crops as Cacao, the process of felling is expensive and often results in unwanted coppice growth from the stump. The most effective and cheap method is frill girdling, which consists of a ring of downwardly directed axe cuts, running into one another and forming a groove. Into this groove is poured a 1 lb. to 1 gall. solution of sodium arsenite, which in Trinidad has been found sufficient for 40 trees of 2 ft. 6 inches in girth. The poison must be used as soon as possible after the frill girdle has been cut, so that it may enter the transpiration stream, otherwise it can only act by the much slower process of diffusion. The poisoning does not render the wood insect-proof.

10. Posts Preserved by the Use of Tubes. A tyre tube treatment for fence posts developed by the United States forest service, is one of the simplest and cheapest treatments for preventing or retarding decay, the wood technicians have devised. The tyre tube treatment is particularly desirable where posts are made from trees growing on the farm.

It must be applied while the post is fresh cut. Fresh cut posts are placed on the ground with the butt end raised. The butts are peeled for a foot or more and a section of a close-fitting old inner tube is slipped over each peeled section and tied tight with several wraps of a strong cord. The open ends of the tubes are clamped to a bar above the butts.

The preservative solution is Zinc Chloride dissolved in nine times its weight of water. It dissolves readily in cold water. The solution is poured into the open ends of the tubes and left until it has been absorbed, usually in 24 hours or less. The solution displaces the sap of the fresh cut posts.

Engineers at the Forest Products Laboratory at Madison estimate that poor quality post timber, such as aspen or sapvine, will last from 10 to 15 years longer if treated with a suitable quantity of Zinc Chloride.

✓ 11. The Propagation of the Mango in Jaffna. By W. R. C. Paul and S. C. Guneratnam. A method of budding mangoes in the nursery for which success is claimed has been devised at the Farm School, Jaffna, Ceylon. The stocks used are seedlings, 6 months to 1 year old, and budding is done at a height of about 10 inches from the ground, at a point where the bark is brownish or greyish in colour, the most suitable time being during a growth flush. To prepare the stock two parallel vertical cuts in the bark $1\frac{1}{2}$ —2 inches long are joined at the top by a horizontal cut. The flap thus cut is pulled

gently down, leaving a patch of the cambium surface exposed. The bud, taken from the current season's growth and with the petiole removed except for a stub of $1\frac{1}{10}$ inch, is cut so that it remains in the centre of a shield about $1-1\frac{1}{2}$ inch in length and of an area slightly less than that of the prepared patch. The cut is made so that a wedge of wood remains underneath the shield. The shield is then placed in the centre of the patch on the stock plant in such a manner that its sides or extremities do not touch the edges of the patch. The flap is now pulled up over the bud, the whole being secured with waxed tape. In hot weather a bud is protected by a strip of dry plantain sheath 3×5 inches tied on the stock above and below. During wet weather the bud is covered with oil paper. After 2—3 weeks the tape is unwound and if the bud is still green, it has probably united. The plantain sheath is replaced. A week later this covering is removed and the stock is ring-barked $1\frac{1}{2}-2$ inches above the bud, the final cutting back of the stock taking place when the bud has grown to a length of 3 or 4 inches.—(Imp. Bur. of Fruit Prod., Hort. Abs. Vol. VII, No. 3, p. 260, 1937. From "Tropical Agriculture," Volume XV, No. 6).

[Various methods of propagating mango by budding are also being tried in the experimental garden at Lyallpur. A certain amount of success has been achieved. It is hoped that a suitable method for budding mangoes will soon be evolved to suit Punjab conditions.—Ed.]

✓12. The Protection of Orange Trees

Against Disease. Food and industrial crops are essential to the life of man, but ever since the dawn of history vegetation in all forms has been subject to the ravages of pests and disease. It is only in recent times that the magnitude of this waste has been realised. In the United States it is estimated that loss to-day due to plant pests and diseases amounts to Rs. 3,233,000,000 annually.

In India millions of people are dependent on crops for food and other necessities of life and, for this reason, it is of paramount importance to find means to protect plants against disease.

Oranges are among the most valuable of crops grown in South India and one of the main centres of cultivation is in the "taluk" of Razampeta, Cuddapah district. In recent years, in this area, growers have been incurring increasing loss due to a disease called "Mottle Leaf" or "Frenching." This is known to exist in many parts of the world. Towards the end of 1935 the disease assumed a more serious form in many gardens. The problem of how to eradicate it was immediately taken up by the agricultural department.

Although the nature of the disease is still obscure, the symptoms are quite definite. In its early stages, yellowish patches appear between the veins of the leaf and on both sides of midrib, which is in contrast to the colour of the leaf as a whole. In a more advanced stage the whole leaf, with the exception of the

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midrib, turns yellow. In cases, where the trees have been allowed to remain in this condition for some time, the leaves assume a peculiar congested appearance, which is characteristic of stunted growth.

Methods of control are simple and inexpensive. It is necessary to spray the trees with a wash composed of zinc sulphate and lime, the recipe for which is given below:

Zinc sulphate	..	2 lbs.
Slaked lime	..	1 lb.
Water	..	20 gallons.

In the rainy season a pound of casein may be used as an adhesive.

[Instead of casein, ordinary wheat flour cooked in water may be used.
—Ed.]

This treatment was quite successful in the garden of M. R. Ry. Badri Jayaramiah Garu who has kindly furnished the following information for publication.

"At the outset about 25 per cent of the trees standing in the garden were treated, sprayings being repeated four times at intervals of from 15 to 20 days from the month of September. In view of the entirely satisfactory results obtained the remainder of the trees, about 210 in all, were sprayed from January onwards. The cost worked out as shown below.

	Rs. a. p.
Zinc Sulphate 128 lbs. at 4 as. per lb.	.. 32 0 0
Lime 64 lbs. at 4 as. per lb.	.. 16 0 0
Cost of labour: Hire on 20 gallon sprayer for 8 days.	.. 8 0 0

16 coolies at 4 as. each	..	4 0 0
Wages & extra wages of messenger at 10 as. day	..	5 0 0
Total	..	65 0 0

The following statement shows the amount for which the garden has been leased during each of the past four years.

Year	Amount realised by lease	Remarks
1934	3,400	No disease.
1935	5,200	do
1936	1,800	Very badly affected
1937	5,025	Completely free from the disease after 4 sprayings.

The owner estimates that during the past year the increased return which may be attributed to the effects of disease eradication is Rs. 2,720.

In view of the success thus obtained large numbers of trees are now being sprayed and already 2,511 have been treated. There are twenty garden owners who have applied for help, and during the next four months it is anticipated that the local demonstrator will supervise the spraying of about 2,000 additional trees.

(Based on the note issued by the Department of Agriculture, Madras.)

P. MAYA DASS, B.Sc., (Agr.),
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ANNALS OF THE BOARD

K. L. KOHLI, M.A., L.S.G.D.,

Assistant Secretary, Punjab P.C. Fruit
Development Board.

During this quarter the Fruit Marketing Standing Committee of the Board met on 20th August, 1938, and the Managing Committee of the Board on 15th October, 1938. The salient features of this quarter may be summed up as under:

1. **The Fruit Marketing Scheme Takes a New Turn.** In the last issue it was reported that the Managing Committee, while approving in principle the out lines of the Fruit Marketing Scheme prepared by the Assistant Marketing Officer Punjab, referred back the same to the Marketing Officer Punjab to work out details of the financial and constitutional aspect of the scheme. The Marketing Officer Punjab prepared a very elaborate scheme costing annually over Rs. 18,000. The Fruit Marketing Standing Committee of the Board, taking into consideration its limited financial resources, considerably curtailed the scheme, and the same was submitted to the Managing Committee of the Board in its meeting of 15th October, 1938. The Managing Committee, while approving of the recommendations of the Fruit Marketing Standing Committee, observed that as the general Body of the members of the Board have not been informed about the plans of the marketing scheme, and as a consequence of the same, most of them must have

already sold their fruits to the garden contractors, it is not advisable to undertake the scheme in entirety this season. However, to prepare grounds for running the scheme, the Headquarters of the Assistant Secretary should be shifted to Lahore, as soon as a suitable office accommodation is procured from the Government.

The Assistant Secretary in consultation with the Marketing Officer Punjab would concentrate his activities in the first instance to carry out the following:

(a) To establish a chain of dependable licensed fruit "arthias" (Commission Agents) throughout the Punjab, and if possible outside, for the marketing of fruits of the mofussil fruit growers associations and the members of the Punjab Fruit Development Board at the best available prices.

(b) To introduce methods of proper grading in various fruit producing centres. For grading purposes the mofussil Fruit Growers Associations and big individual fruit growers to be persuaded to install cheap graders.

(c) To introduce convenient packages and make them available to the affiliated associations and members of the Board at cheap sale or rental rates, and to otherwise carry out general propaganda for standardisation of

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marketing practices regarding weights and measures in the Punjab markets.

(d) To start systematic campaign for advertising the Punjab Fruits under special Brands of the Board in the Punjab territories and outside, so as to build a good-will for the Punjab Fruits and thus prepare grounds for eventually introducing a sort of National Mark scheme for building decent internal and export trade for the Punjab Fruits.

[Note.—For making the marketing scheme a success, we solicit the Co-operation of the Executives of the moffusil Fruit Growers Associations and all leading fruit grower members of the Board. All those who are keen on participating in the beneficial marketing programme this season, are requested to communicate with the Hony. Secretary of the Board immediately—Ed.]

2. Demand of Funds from the Punjab Government for the Marketing Scheme and the Bud Selection Programmes. Recently lengthy correspondence has passed between the President of the Board and the Joint Secretary to Government Punjab, Development Departments, regarding allotment of grants for the Board from the Provincial Exchequer from the year 1939-40. Our demands are that from the year 1939-40 the grant of the Board should be made a recurring one, and should not be less than Rs. 5,000 in any case to cover the general expenses of the establishment and of the intended Fruit Marketing Scheme; while for the Bud Selection programme a special grant of Rs. 3,000 annually for three years be allotted.

3. The Question of Enhanced Supply of Water for Orchards. In reply to a representation addressed to the Hon'ble Minister for Revenue Punjab, by the President of the Board, a provisional reply has been received from the Secretary to Government Punjab, P.W.D. Irrigation Branch, purporting that the Irrigation Department Punjab, has approved for granting the following concessions for fruit culture in the Province.

(a) To allow double 'wari' to the areas selected for fruit orchards.

To allow a maximum of $\frac{1}{2}$ per cent of the total C.C.A. on any canal to be granted as the concession of double 'wari' for fruit orchards.

But these proposals are as yet only of tentative nature awaiting sanction of the Government, and the matter is still under discussion with the Director of Agriculture, Punjab. The matter is being referred to the Land Standing Committee (formerly Canal Sub-Committee) for formulating further lines of action of the Board in the matter.

4. Proposal for Grant of Small Garden Plots Adjacent to Colony Towns for Running Commercial Gardens. The proposal of S. Satwant Singh for approaching the Government for grant of small garden plots, varying from 6 to 12 acres, adjacent to Colony towns and in other places where land may be available, for running commercial orchards, has been accepted by the Managing Committee.

5. Hitch in the Lease of the Nazul Plot Outside Shahalami Gate, Lahore.

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The Deputy Commissioner, Lahore, informed that the former lessee, Karam Din, had filed a civil suit with respect to the plot in question, and that the proposal for the institution of a suit of ejectment against him was under examination. The reply of the Administrator, Lahore Municipality, was still more unsatisfactory purporting that, as the Municipal Administration of Lahore would be re-organised, it would no longer be desirable for him to surrender the duty of providing adequate markets for the population of Lahore to any other body. (Notwithstanding all this, higher authorities have been moved to expedite legal technicalities to hand over the site in

question to the Board at an early date.—Ed.)

6. The Punjab Fruit Journal liberally Patronised by the Local Bodies of the Punjab. During this quarter there has been considerable addition in our subscription list, particularly from local bodies of the province. The notable additions from the local bodies are as under:

1. D. B. Mianwali 14 copies annually
2. D. B. Ludhiana 10 copies annually
3. D. B. Lyallpur 6 copies annually

[We trust that the other local bodies of the province will follow the good examples set by the above District Boards.—Ed.]

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پنجاب فروٹ جزبل کے ان خریدار صاحبان کا جندہ جن کی خدمت میں بجزبل ۳۸ نمبر سے حکم ہو رہا ہے اس اشاعت کے ساتھ تھم ہو جائیگا۔ لاب ان کی خدمت میں گزارش ہے کہ وہ ازراہ کرم بدلنے ۲/۱۲ بولپری ارسال فرمادیں وہ رسمی نذریت میں آئندہ اشاعت کیا جائیں یعنی قیمتی - ۵/۱۲ ارسال ہو گا۔

میر

نایاب تخفیف

پنجاب فروٹ ٹو ٹیپنٹ بورڈ نے عالی ہی میں جاری کیے ہیں اسیے مصنفوں از جانب مردار الال سینئر صاحب فروٹ سپلائیر کے نایاب گورنمنٹ شارٹ کے ہیں۔ جو غیر ملکیت یعنی مصلحیں اُنمی میں فرانس اور مشترکہ فونڈیشن کے فونڈیشن میں جو دوستی والے ہیں۔ ان میں ملکیت کے متعلق عکس کے روڑوں اخراجات اور سالہ جات میں نہایت سزا دی جائی کے لئے ہیں۔ ذائقی بر صاحب ذوق کے لئے ایک نایاب تخفیف ہیں قیمت دیوار فرنٹ صرف دوڑ پے بذریعہ ای اڑدار و دوڑ پے یعنی آئندہ بذریعہ دی۔ پی۔ منگاتے بکا پتہ۔

آنری سیکرٹری پنجاب پر افضل کو اپر ٹیپو فروٹ ٹو ٹیپنٹ بورڈ لاکل پور

گریوائی نرسی بارہ دری گارڈن لشن پورہ ریال

پل: (۱) مکمل زراعت پنجاب گورنمنٹ کی سطح پر شدہ نرسیری ہے۔ جو پنجاب فروٹ شو میں بارہ دفعہ اول دوہم درجہ کے انعامات حاصل کر سکتی ہے۔

(۲) خاص کر ترشادہ یعنی تانٹا میٹر کے بیوں گریپ فروٹ وغیرہ کی بہترین دیجی دو لاٹھی ہی نئی اقسام موجود ہیں۔

(۳) پورے قوتا میں نہایت عمدہ اور قسم کے لحاظ سے قابلیتیں جس کے لئے خوبی گارڈنی وی جانشکتی ہے۔

(۴) بیتول میں بمقابلہ دسری نرسیری کے نہایت ارزال اور بہترین پیکنگ کے ساتھ وہ اس کے جاتے ہیں۔ آزانش لازمی ہے۔ پرانی لٹ مفت طلب کریں۔

میجنگ دائرکٹر دی گریوائی نرسیری لشن پورہ (پائل) اپنے باب

روضت با عنیان کا شناختکاری اور با غافی کے فن میں۔ رسالہ اپنی بیٹری آپ ہی ہے لیں کا حسین محلی نائیں پیچھے نظر دلفتی ہتھا چل کے بلند پائیں مصائبین بیکار و جواہر کو پا کا رہنا یعنی یہ ہے ذمہ دار ہو جائے ہیں۔

ذمہ دار اور کاشتکار زو دلوں کی تھی تھیت اس کا خاص خرض ہے۔

هم کھجست صوبہ بہار و صوبہ مستوط نوراڑ کے میونسپل ہیں۔ کہ انہوں نے اس رسالہ کو منظور فرمائی اپنی علم و دستی اور کسان بورڈی کا پیش ویا ہے قیمت ہست کی تھی صرف دو روپیے سالا دیہ رسالہ ۱۹۳۶ء کی تقطیع کے ۲۲ صفحات پر پہاڑ آپ و تاب کے ساتھ نامہ شائع ہو رہا ہے تھا۔ تاکہ دیساں کی خوست بھی فربہ ہی وہ ہو جاتے رہ سکیں جاتا ہے۔ اس بے بہار اور کاشتکار زو دلوں کے لئے جلدی یعنی تاکہ دیساں کی خوست بھی فربہ ہی وہ ہو جاتے۔

میجنگ روپت با عنیان ہن میں نرسیری سہماں پور